July, 1949

EDISON ELECTRIC INSTITUTE BULLETIN

LIBRARY

		Page
Wartime and Postwar Achievements of the Electric Utility Industry	WALKER L. CISLER	225
Standardization—An Investment	A. C. MONTEITH	234
The Present and Future of Thermal Prime Movers	CHARLES W. E. CLARKE	237
Economic Distribution for Tomorrow's Loads	T. J. BROSNAN	243
Rate Trends and Problems	S. W. ANDREWS	246
Residential Rates for Tomorrow's Loads	L. R. LEFFERSON	250
The Lawyer's New Tasks in Rate Proceedings	PAUL W. McQUILLEN	253
The Industry's Part in the Financing Program	HAROLD H. SCAFF	257
Long Term Lease Financing and Its Applicability to Electric Utility Companies	W. W. BODINE	261
Protecting the Taxpayer	Hon. C. E. GLANDER	265
Economic Trends and Their Possible Effects on the Future	GEORGE B. ROBERTS	268
We Must Sell Aggressively Today	EDWIN VENNARD	272
What Are We Selling For?	D. C. McKEE	277
The Sale We Must Not Lose	M. E. SKINNER	280
EEI Publications and Service Material		283
Personals		285
Conventions and Meetings		288

PUBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

April, 1948-1949

SOURCE AND DISPOSAL OF ENERGY—MONTH OF APRIL

	1949	1948	%
GENERATION* (Net)			
By Fuel Burning Plants	15,057,217,000	14,415,663,000	+ 4.5
By Water Power Plants	8,157,535,000	7,880,690,000	+ 3.5
Total Generation	**23,214,752,000**	**22,296,353,000**	**+ 4.1**
Add—Net Imports Over International Boundaries	126,400,000	111,010,000	+13.9
Less—Company Use	119,110,000	125,444,000	− 5.0
Less—Energy Used by Producer	362,802,000	416,935,000	−13.0
Net Energy for Distribution	**22,859,240,000**	**21,864,984,000**	**+ 4.5**
Losses and Unaccounted for	2,439,549,000	2,464,984,000	− 1.0
Sales to Ultimate Customers	**20,419,691,000**	**19,400,000,000**	**+ 5.3**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of April 30th			
Residential or Domestic	34,114,995	32,170,637	+ 6.0
Rural (Distinct Rural Rates)	1,706,309	1,578,780	+ 8.1
Commercial or Industrial:			
Small Light and Power	5,161,817	5,013,767	+ 3.0
Large Light and Power	228,288	194,071	+17.6
Other Customers	143,857	137,227	+ 4.8
Total Ultimate Customers	**41,355,266**	**39,094,482**	**+ 5.8**
KILOWATTHOUR SALES—During Month of April			
Residential or Domestic	4,762,628,000	4,158,985,000	+14.5
Rural (Distinct Rural Rates)	531,458,000	463,227,000	+14.7
Commercial or Industrial:			
Small Light and Power	3,684,720,000	3,450,087,000	+ 6.8
Large Light and Power	10,140,987,000	10,014,443,000	+ 1.3
Street and Highway Lighting	205,026,000	187,530,000	+ 9.3
Other Public Authorities	521,930,000	509,026,000	+ 2.5
Railways and Railroads:			
Street and Interurban Railways	312,863,000	339,207,000	− 7.8
Electrified Steam Railroads	212,367,000	220,712,000	− 3.8
Interdepartmental	47,712,000	56,783,000	−16.0
Total To Ultimate Customers	**20,419,691,000**	**19,400,000,000**	**+ 5.3**
Revenue from Ultimate Customers	**$374,712,800**	**$346,888,800**	**+ 8.0**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended April 30th			
Kilowatthours per Customer	1,607	1,490	+ 7.9
Average Annual Bill	$47.89	$45.30	+ 5.7
Revenue per Kilowatthour	2.98¢	3.04¢	− 2.0

(*) By Courtesy of the Federal Power Commission.

Vol. 17, No. 7, EDISON ELECTRIC INSTITUTE BULLETIN; published monthly. Entered as second-class matter Aug. 17, 1933, at the post office at Philadelphia 2, Pa., under the act of March 3, 1879. Publication office, 56th and Chestnut Sts., Philadelphia 39, Pa. Editorial office, **420 Lexington Ave., New York 17, N. Y.** Subscription rate $2.00 per year in the United States; $3.00 per year in foreign countries.

The Edison Electric Institute does not assume responsibility for, nor necessarily endorse or approve, statements made by contributors to the BULLETIN.

DISON ELECTRIC INSTITUTE BULLETIN

olume 17 JULY, 1949 No. 7

Wartime and Postwar Achievements of the Electric Utility Industry

By Walker L. Cisler

Executive Vice President, The Detroit Edison Company

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 1, 1949

ACHIEVEMENTS of the electric utility industry in war and peace, have and will continue to e a tremendously constructive effect the economic strength, security, and l-being of our people as individuals as a nation. I am rightfully proud the outstanding record achieved by electric utility industry during the and postwar periods.

t is full of accomplishment on the of the many people in the industry have carried out their duties and onsibilities with great credit and dis- tion to themselves and to their or- izations. It has truly been a record high "public service."

The Electric Power Situation

Because my experience and duties have ught me into close and active asso- ion with it and because of its signifi- t importance, I approach the subject h a deep sense of duty to our indus- to the people in it, and to our pub- I am hopeful this paper may serve seful and needed purpose in present- a clear and accurate picture of the tric power situation.

n speaking of the electric power in- try, I mean both the operating and ufacturing components of it, be- e each one complements and sup- ents the other.

Within the operating industry itself, erms of generating capacity, about er cent of the systems are privately ed, approximately 10 per cent are rally owned, and the remaining 10 cent are non-federal systems. Thus

MR. CISLER

the industry is predominately a part of the American system of free and individual enterprise and one of the greatest bulwarks against the advance of foreign "isms" that are contrary to our way of life.

As an industry, we are an important part of our great industrial system, using the natural resources of fuels, water, minerals, and the products of the land. The history of the industry is full of the progress made in the more efficient use of these, and thus their conservation for the benefit of those who will follow us.

Wartime Achievements

When the United States entered World War II there already existed great sources of thermal and hydraulic generated electric power which were so necessary to the successful prosecution of the war effort. The country was heavily interconnected with transmission lines and transformation facilities. The earlier war-preparedness requirements had been successfully met. The margin of reserve, namely the difference between system loads and capability to carry load, was sufficient to initially meet the increased loads brought about by military and civilian needs. There was a large expansion program already under way in all parts of the country. This was true for all systems regardless of ownership.

The Electric Industry's Record

It was apparent even before Pearl Harbor that, because of the urgency and priorities for direct military production, not all of the electric power program could be carried out. The production of ships, tanks, planes, trucks, and thousands of other military items, required the conversion of existing manufacturing facilities and the construction of new ones. The same machine tools, shops, materials and manpower to build equipment for ships, aluminum presses, and atomic energy plants are used to build heavy electric power equipment.

It was realized that first things had to come first. Orderly production of new generating and other essential equipment and materials had to be resolved among the many influencing problems. The situation was approached on several fronts, all necessary to the accom-

plishment of the objective of meeting military and essential civilian requirements.

The electric utilities put their shoulder to the wheel, as did other industries, making experienced personnel available to the Government. Recommendations were made as to the best means of solving the problems which confronted the industry and the governmental agencies during those trying days. The spirit of cooperation was of the highest. No industry was more patriotic or more constructive in assisting in the successful prosecution of the war.

The Government in turn did its part in this mutually important mission. It was thoughtful and intelligent in its approach. Within the limits permissible in such an industry-government relationship, it made a partner of the industry. Industrial advisory groups were formed and gave valuable advice. The effort brought forth the best that each could contribute. The record of the War Production Board stands high in the memory of those who had to deal with it. It did an excellent job, frequently under very difficult circumstances.

Wartime Problems

Time does not permit telling of the problems which had to be solved: the greater utilization of existing generating plants, interconnecting transmission lines, and stocks of materials and supplies; area requirements; the determination of what new construction should go forward; and then the successful carrying out of these. The orderly scheduling and manufacture of heavy power equipment had to be worked out in cooperation with the military services, the manufacturers, and others affected.

It was fully realized that in giving governmental authority for only approved projects to go forward during the war period, there would be a postwar period during which no major additions of facilities could be made because of the many months required to manufacture large turbine generating units and other major equipment. This fact must be borne in mind in connection with the postwar period when the industry has been subject to unfair criticism on the part of individuals and agencies, either knowingly or unknowingly. The situation thus created must be kept clearly in focus in order that there be no misunderstanding in the minds of the public.

The wartime electric power requirements of the nation were fully and adequately served. The maximum demand came in 1944. Many times overseas, as I saw the vast quantities of military equipment and supplies move up to the front, I was devoutly thankful that our industry had met the challenge for an ample supply of power.

Postwar Achievements

The end of hostilities found the utilities ready to proceed with the construction of projects, earlier stopped, as government wartime restrictions were relaxed. Orders were placed for still more equipment to build up reserve margins which had been reduced during the war, and to provide for load growth. The industry entered upon the greatest expansion program of its history. But the manufacture of heavy power equipment, even under the most favorable conditions, takes many months and there were many postwar readjustments to be made before normal production schedules could be resumed. Manpower and material difficulties all had a delaying effect on getting additional generating equipment into service. It was not until 1947 that any appreciable amount of new postwar capacity became available.

Meanwhile, reconversion to peacetime activities had advanced rapidly and electric demands increased at an accelerated and unprecedented rate to a peak in 1946 that was 10 per cent higher than the highest wartime peak. It is understandable why reserve margins became so little in 1947 and 1948 as compared to normal accepted margins, and why restrictions in consumption had to be applied in certain areas because of lack of capacity or a lack of energy, largely affected by scarcity of rain or snowfall. That such restrictions have occurred is, of course, unfortunate and no industry feels it more than the utility industry which is fully conscious of its responsibilities to the public. Compared to the restrictions which have been, and continue to be, in effect in other countries—especially those allied with us—our own situation has been insignificant.

Faced with dwindling reserves, and in some instances a lack of them, the operating people of the industry moved into the line and prepared for action. Their resourcefulness has seemed almost boundless. They have produced more and more where it seemed limits had already been reached. I know of this at first hand, my experience has brought me in close touch with it. Everywhere the story has been the same, people and management have been minded to accomplish the utmost.

No decree, no order, could have brought about equal or better results. There is no substitute for the will and determination of individuals to do their job when challenged to the test. I would like to express my deep admiration for the people in our country—both private and public—who have done so much in this eventful postwar period. This group includes the men whose duties required hard physical labor as well as the skilled operators and engineers, for they all had a share in accomplishing our postwar achievements, which have been even greater than those during the war.

Present Situation

The Edison Electric Institute has just recently completed its Fifth Semi-Annual Power Survey. It is, I believe, the most complete and up-to-date factual picture of the present and expected load, capability, new construction, and heavy electric power equipment manufacturing situations throughout the country. It covers practically the entire electric power industry, and should be considered with confidence and respect. This survey has been put together by people who are extremely close to the various situations and who have an extensive background of prewar, war and postwar experience.

The data which I have to present in this paper have been obtained from reliable sources and are the result of the efforts of many people and organizations. I wish to gratefully give my thanks to all who have so helpfully contributed.

The detailed tabulation, graphs, and maps which appear here are self-explanatory, and, therefore, I shall discuss them only briefly. However, there are certain important over-all results which are extremely significant and worthy of careful consideration. They are revealing and should inspire confidence in what the electric power industry is accomplishing.

First, let us consider the peak capabilities, peak loads, reserve margins and energy for the eight power regions and for the country as a whole for the five-year period 1947 through 1951 for median hydro conditions. (Figs. 1, 2, 3 and 4.)

Peak capabilities have progressively increased throughout the power regions. These are the result of greater utilization of present generating resources and the addition of new generating units which reaches full momentum in 1949 when 7,000,000 more kilowatts are scheduled for service. In four years about 23½ million kw will have been added to the electric power systems.

Practically all of this new capacity results from installations of highly efficient generating equipment. Of this, more than three-fourths will be in thermal plants and the balance in hydraulic plants. Solid fuels will be used in about two-thirds of the new thermal plants.

The electric power industry is now the largest consumer of solid fuels. In the modern thermal electric generating plant, a ton of coal produces nearly five times as many kilowatthours as the average plant produced in 1914. This in itself is a most significant contribution to the conservation of a basic natural resource, and is an indisputable proof of the initiative and enterprise of the industry in pioneering developments which in part have made possible lower production costs.

Peak loads also show an increase throughout all regions. The per cent increases vary between regions and with the years. For the country, it is greatest in 1949 when 9 per cent is expected. In 1950, the estimate is 7 per cent and in 1951 a little more than 6 per cent—a somewhat less steep peak load growth as compared to the present year. It still remains a high increase, however, and shows the confidence of the industry in meeting existing connected loads, the promotion of increased use of these, and the addition of new loads.

Reserve Margins

The margins for reserves for the country as a whole demonstrate conclusively that the industry has passed the point where loads were growing faster than new generating equipment could be manufactured, installed, and put into operation. The low point of 5.6 per cent in reserves was reached in 1948. It will be substantially increased to 9.7 per cent in 1949, 12.3 per cent in 1950, and 15.9 per cent in 1951, which is certainly a safe margin for both peacetime and national defense requirements.

It should be pointed out that the improved reserve margins reflect in part the lower trend in load growth which present conditions indicate as well as a speeding up of construction schedules. This means that safe margins will exist at least a year earlier than might otherwise have been the case. Region III, the Southeast, does not take into account new steam units which the Federal Government may have in operation by 1951. Since preparing this, I have learned that the first unit will be in service in January, 1952. While the Western Division of Region VII, the Pacific Northwest, shows a small deficiency of capability in 1949, 1950 and 1951, the region as a whole shows capabilities and peak load about equal for median hydro conditions. For adverse hydro conditions there would be a deficiency in capabilities. To establish reserve margins and to provide for estimated load increases beyond 1951, substantial amounts of new capacity should be added.

The expansion program of the industry has had to accomplish two purposes from a capability standpoint: (1) to meet increased loads; and (2) to reestablish normal and safe reserves. Consequently, it would be unwise to slacken the speed of generating plant additions except where particular situations are such that pushing construction ahead at an accelerated pace would result in an economic waste.

Estimated Energy Production

The estimated production of energy to meet consumption requirements for 1949 shows an increase of 8.3 per cent; for 1950 it is 6.3 per cent; and for 1951, 5.9 per cent. These figures reflect the somewhat lower rates of increase for the two years beyond 1949 which is consistent with the estimated increase in peak loads for the same two years.

I believe the country can confidently expect that electric power loads will in general be adequately met in 1949, 1950, and 1951. There may be local situations where use restrictions may be necessary. But, on the whole, there will be no power shortage as the greater reserve margins clearly indicate.

Now let us consider the manufacturing situation as it pertains to the shipment and scheduled production of heavy electric power equipment. It is a most encouraging picture and clearly demonstrates the capacity of our manufacturers to produce at tremendous rates. It is a great credit to them that they are meeting schedules so effectively and are expanding facilities for increased production to the point in 1951, when the capacity to build steam and hydraulic generating units will be 10 million kw per year—a truly great production, and an outstanding example of the productive power of American industry. Of this capacity, 8 million kw of steam units can be manufactured, and 2 million kw of hydraulic units.

For the first four months of 1949, shipments of thermal and hydraulic units, 4000 kw and larger, to utilities in continental United States amounted to 1,839,100 kw. For the year 1949, the presently scheduled shipments will total 6,279,600 kw; in 1950, 6,451,450 kw; and in 1951, 4,591,225 kw. In 1950 there is some open manufuacturing capacity for building steam units, and a still greater amount in 1951. Consequently, it would be possible to schedule the manufacture of some additional units for delivery in 1950 and 1951. (Figs. 5, 6, 7 and 8.)

The capacity to build steam generators is more than equal to that of steam turbines and because of the shorter manufacturing time required, there is a large amount of open manufacturing capacity in 1950. So far only a small part of the total manufacturing capacity has been scheduled for 1951. (Figs. 11 and 12.)

In the case of water wheel generators and hydraulic turbines, there is open-shop capacity in 1950 and a still larger amount in 1951. The open capacity to build power transformers is still large for 1950, and only a small part of the capacity has been scheduled for 1951. It should be understood in interpreting "open-shop manufacturing capacity" that, in order to utilize it, production must be scheduled sufficiently far in advance to allow for the manufacturing time required. There is every reason to believe that manufacturing schedules will continue to be met successfully. (See Figs. 9, 10, 13, 14, 15 and 16.)

Future Expansion and Developments

As to the future beyond 1951, it is expected that substantial load growth will continue and extensive capacity additions will be required. The increases will be dependent upon many factors, the most important of which will be the level of our national economy. The outlook, based upon past and predicted conditions, remains bright; and the industry will go forward guided

(*Continued on page* 231)

FIG. 1—F. P. C. POWER SUPPLY REGIONS, SUPERIMPOSED ON MAP OF PRINCIPAL INTERCONNECTED ELECTRIC TRANSMISSION LINES

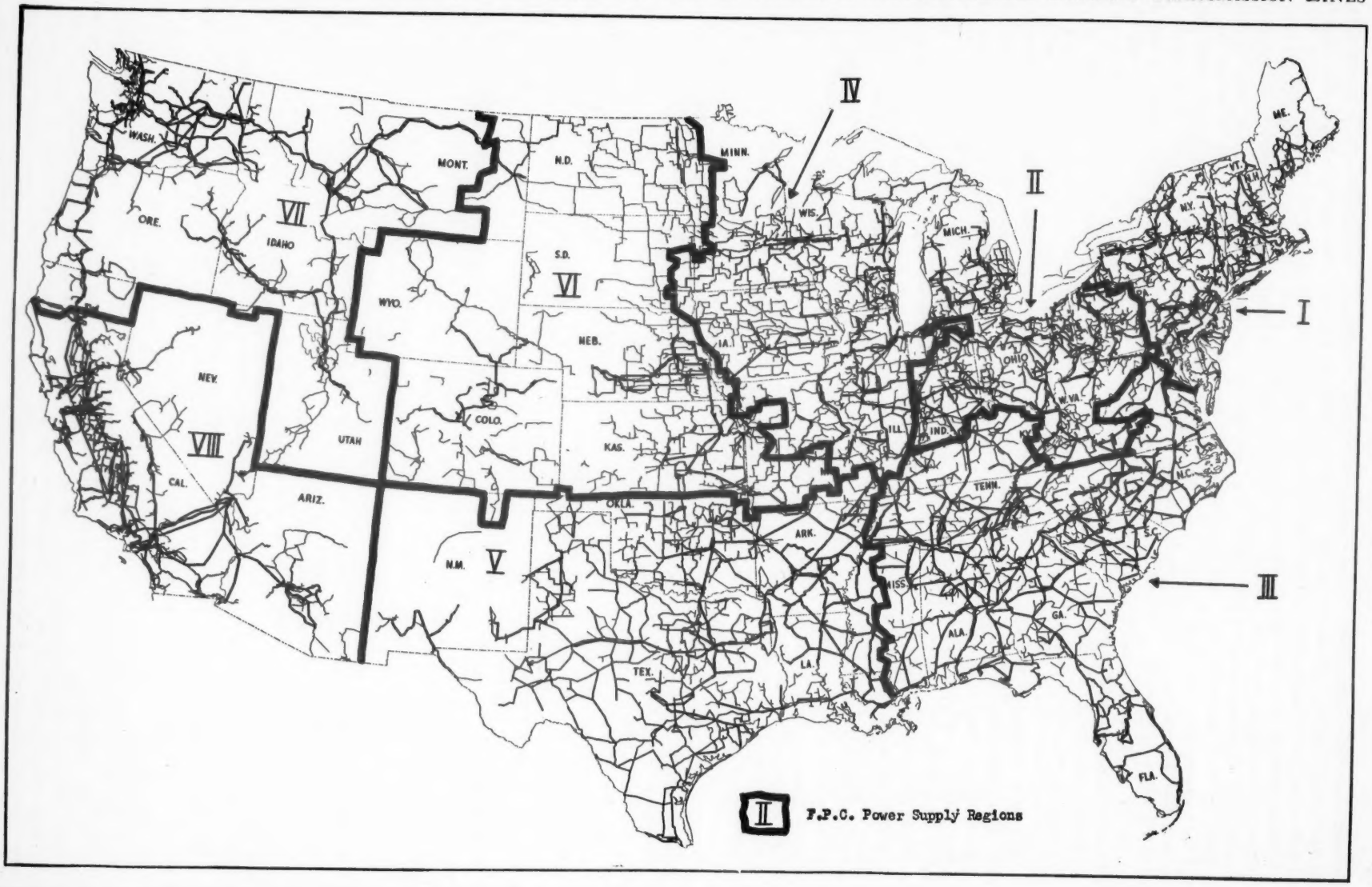


Fig. 2—Total USA—Peak Capabilities and Peak Loads, 1947 Through 1951—Reserve

Fig. 3—Regional—Peak Capabilities and Peak Loads, 1947 Through 1951—Reserve Margins Shown in Per Cent of Peak Loads—Median Hydro Conditions

Fig. 2—Total USA—Peak Capabilities and Peak Loads, 1947 Through 1951—Reserve Margins Shown in Per Cent of Peak Loads

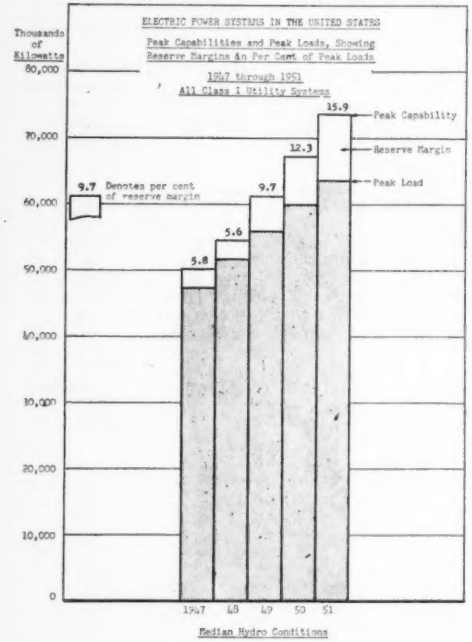


Fig. 3—Regional—Peak Capabilities and Peak Loads, 1947 Through 1951—Reserve Margins Shown in Per Cent of Peak Loads—Median Hydro Conditions

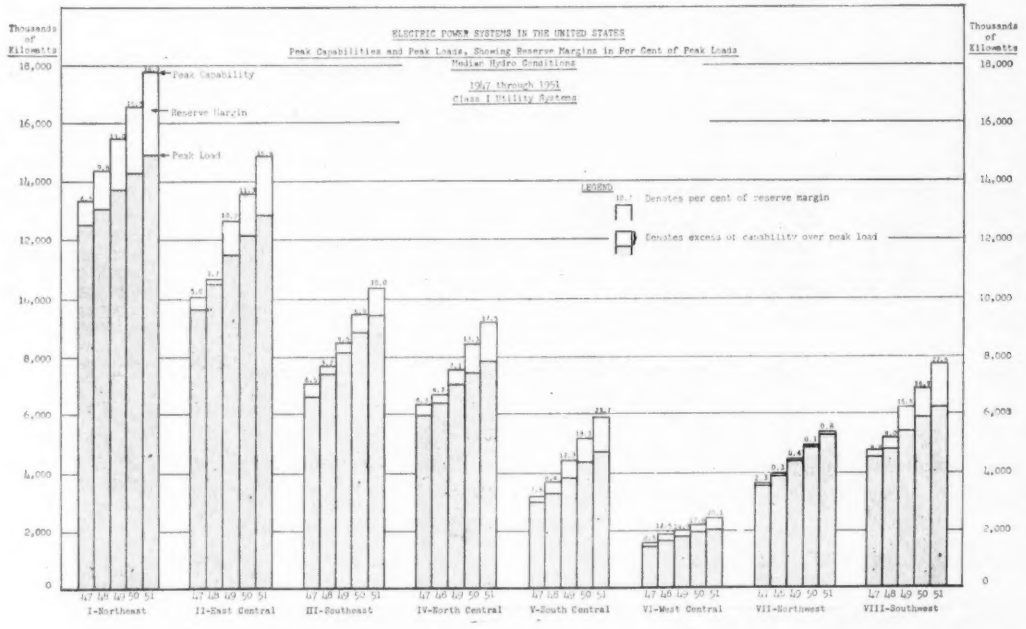


Fig. 4—Peak Capabilities, Peak Loads, Reserve Margins and Electric Energy Output, By Regions, 1947 Through 1951, Median Hydro Conditions—Class 1 Utility Systems

Regions*	Peak Capabilities (Thousands of Kilowatts) 1947	1948	1949	1950	1951	Peak Loads (Thousands of Kilowatts) 1947	1948	% Inc.	1949	% Inc.	1950	% Inc.	1951	% Inc.	Margins for Reserves and Additional Load (Thousands of Kilowatts) 1947	% of Load	1948	% of Load	1949	% of Load	1950	% of Load	1951	% of Load	Electric Energy Output (Millions of Kilowatthours) 1947	1948	% Inc.	1949	% Inc.	1950	% Inc.	1951	% Inc.	Regions*
I. Northeast	13,332	14,405	15,497	16,545	17,765	12,521	13,120	4.8	13,719	4.6	14,319	4.4	14,944	4.4	811	6.5	1,285	9.8	1,778	13.0	2,226	15.5	2,821	18.9	65,110	69,287	6.4	72,580	4.8	75,657	4.2	78,928	4.3	I. Northeast
II. East Central	10,189	10,713	12,664	13,558	14,841	9,701	10,531	8.6	11,493	9.1	12,183	6.0	12,862	5.6	488	5.0	182	1.7	1,171	10.2	1,375	11.3	1,979	15.4	52,601	58,412	11.0	63,142	8.1	67,434	6.8	71,052	5.4	II. East Central
III. Southeast	7,106	7,720	8,502	9,438	10,357	6,670	7,484	12.2	8,139	8.8	8,826	8.4	9,415	6.7	436	6.5	236	3.2	363	4.5	612	6.9	942	10.0	36,000	41,181	14.4	44,947	9.1	46,368	3.2	48,865	5.4	III. Southeast
IV. North Central	6,399	6,764	7,531	8,456	9,237	6,018	6,462	7.4	7,033	8.8	7,463	6.1	7,861	5.3	381	6.3	302	4.7	498	7.1	993	13.3	1,376	17.5	31,906	35,225	10.4	37,452	6.3	39,544	5.6	41,607	5.2	IV. North Central
V. South Central	3,200	3,693	4,468	5,226	5,909	2,973	3,406	14.6	3,980	16.9	4,418	11.0	4,778	8.1	227	7.6	287	8.4	488	12.3	808	18.3	1,131	23.7	16,344	18,911	15.7	21,830	15.4	24,286	11.3	26,299	8.3	V. South Central
VI. West Central	1,538	1,804	1,995	2,213	2,438	1,417	1,602	13.1	1,736	8.4	1,879	8.2	2,030	8.0	121	8.5	202	12.6	259	14.9	334	17.8	408	20.1	7,302	8,182	12.1	8,795	7.5	9,493	7.9	10,238	7.8	VI. West Central
VII. Northwest	3,601	3,973	4,511	4,974	5,463	3,520	3,960	12.5	4,493	13.5	4,969	10.6	5,418	9.0	81	2.3	13	0.3	18	0.4	5	0.1	45	0.8	20,859	23,808	14.1	27,908	17.2	30,661	9.9	33,355	8.8	VII. Northwest
East Division	713	807	903	1,009	1,102	699	780	11.6	875	12.2	960	9.7	1,028	7.1	14	2.0	27	3.5	28	3.2	49	5.1	74	7.2	4,130	4,500	9.0	5,023	11.6	5,611	11.7	6,037	7.6	East Division
West Division	2,888	3,166	3,608	3,965	4,361	2,821	3,180	12.7	3,618	13.8	4,009	10.8	4,390	9.5	67	2.4	-14	-0.4	-10	-0.3	-44	-1.1	-29	-0.7	16,729	19,308	15.4	22,885	18.5	25,050	9.5	27,318	9.1	West Division
VIII. Southwest	4,768	5,229	6,293	6,897	7,723	4,550	4,840	6.4	5,450	12.6	5,900	8.3	6,300	6.8	218	4.8	389	8.0	843	15.5	997	16.9	1,423	22.6	25,000	27,100	8.4	29,000	7.0	31,500	8.6	33,750	7.1	VIII. Southwest
Total United States	50,133	54,301	61,461	67,307	73,733	47,370	51,405	8.5	56,043	9.0	59,957	7.0	63,608	6.1	2,763	5.8	2,896	5.6	5,418	9.7	7,350	12.3	10,125	15.9	255,122	282,106	10.6	305,654	8.3	324,943	6.3	344,094	5.9	TOTAL UNITED STATES

* As defined by Federal Power Commission

Fig. 5—Total Capacity for Manufacture of Large and Small Steam Turbine-Generators

Showing Capacity of Equipment on Order and Scheduled for Shipment as of May 1, 1949; and Open Capacity for Manufacture of Additional Equipment for Delivery in Years Indicated

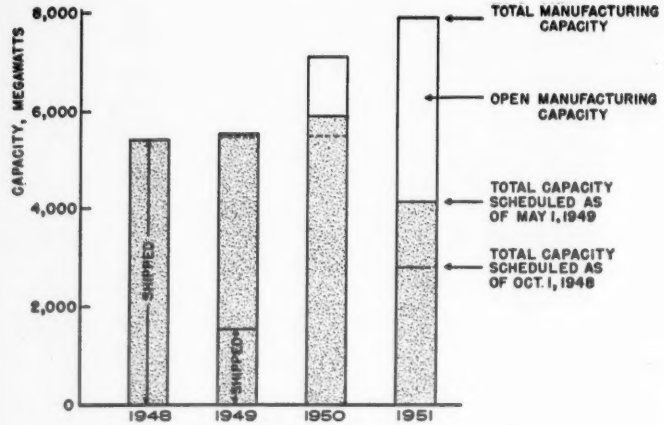


Fig. 6—Total New Electric Generating Capacity, Thermal and Hydraulic (Nameplate Rating)

Shipped and on Order as of May 1, 1949, Scheduled for Shipment—Kw Capacity: Units of 4000 Kw and Larger

Regions*	1948 (Shipped)	First 4 Months of 1949 (Shipped)	Last 8 Months of 1949	Total 1949	1950	1951
I	1,318,500	155,625	397,400	553,025	1,270,700	822,350
II	922,500	275,000	1,327,500	1,602,500	825,000	1,120,000
III	616,800	249,500	624,675	874,175	1,090,000	1,065,750
IV	491,500	370,000	497,900	867,900	1,010,000	532,500
V	590,000	206,500	474,775	681,275	888,750	392,500
VI	254,000	126,850	188,325	315,175	180,000	255,000
VII	566,500	268,500	447,225	715,725	502,000	220,625
VIII	816,950	187,125	482,700	669,825	685,000	184,500
Continental U.S. Utilities	5,376,750	(1,839,100	4,440,500) =	6,279,600	6,451,450	4,591,225
Continental U.S. Industrials	577,500	-	-	465,400	110,000	80,000
Outside Continental U.S.	922,350	-	-	624,850	436,350	356,500
Total	6,876,600	-	-	7,367,850	6,997,800	5,027,725

Fig. 7—New Large Steam Turbine-Generator Capacity

Shipped and on Order as of May 1, 1949, Scheduled for Shipment—Kw Capacity: Units of 10,000 Kw and Larger

Regions*	1948 (Shipped)	First 4 Months of 1949 (Shipped)	Last 8 Months of 1949	1949	1950	1951
I	1,267,500	105,000	365,000	470,000	1,260,000	795,000
II	900,000	275,000	1,322,500	1,597,500	825,000	1,120,000
III	435,500	182,500	320,000	502,500	945,000	797,500
IV	427,500	305,500	381,500	687,000	990,000	532,500
V	464,000	206,500	431,000	637,500	810,000	220,000
VI	200,000	60,000	144,000	204,000	160,000	255,000
VII	-	-	51,500	51,500	-	120,000
VIII	581,500	72,500	306,500	379,000	550,000	20,000
Continental U.S. Utilities	4,276,000	1,207,000	3,322,000	4,529,000	5,540,000	3,860,000
Continental U.S. Industrials	170,000	-	-	282,500	100,000	80,000
Outside Continental U.S.	112,500	-	-	147,500	155,500	240,000
Total	4,558,500	-	-	4,959,000	5,795,500	4,180,000

* As defined by Federal Power Commission

Fig. 8—New Small Steam Turbine-Generator Capacity

Shipped and on Order as of May 1, 1949, Scheduled for Shipment—Kw Capacity: Units 4000 to 9999 Kw

Regions*	1948 (Shipped)	First 4 Months of 1949 (Shipped)	Last 8 Months of 1949	1949	1950	1951
I	12,500	20,000	-	20,000	5,000	-
II	22,500	-	5,000	5,000	-	-
III	25,000	6,000	-	6,000	22,500	-
IV	64,000	29,500	32,500	62,000	20,000	-
V	56,000	-	16,000	16,000	5,000	-
VI	31,500	26,000	21,000	47,000	5,000	-
VII	-	7,500	-	7,500	-	-
VIII	33,000	7,500	30,000	37,500	22,500	-
Continental U.S. Utilities	244,500	96,500	104,500	201,000	80,000	-
Continental U.S. Industrials	407,500	-	-	150,900	10,000	-
Outside Continental U.S.	225,500	-	-	259,000	15,000	-
Total	877,500	-	-	810,900	105,000	-

Fig. 9—Total Capacity for Manufacture of Water Wheel Generators

Showing Capacity of Equipment on Order as of May 1, 1949, and Scheduled for Shipment; and Open Capacity for Manufacture of Additional Equipment for Delivery in Years Indicated

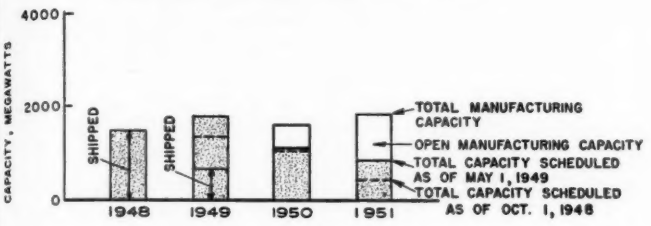


Fig. 10—New Water Wheel Generator Capacity

Shipped and on Order as of May 1, 1949, Scheduled for Shipment—Kw Capacity: Units of 4000 Kw and Larger

Regions*	1948 (Shipped)	First 4 Months of 1949 (Shipped)	Last 8 Months of 1949	1949	1950	1951
I	38,500	30,625	32,400	63,025	5,700	27,350
II	-	-	-	-	-	-
III	156,300	61,000	304,675	365,675	122,500	266,250
IV	-	35,000	83,900	118,900	-	-
V	70,000	-	27,775	27,775	75,750	172,500
VI	22,500	40,850	23,325	64,175	15,000	-
VII	566,500	261,000	395,725	656,725	502,000	100,625
VIII	202,450	107,125	146,200	253,325	112,500	164,500
Continental U.S. Utilities	856,250	535,600	1,014,000	1,549,600	851,450	751,225
Continental U.S. Industrials	-	-	-	30,000	-	-
Outside Continental U.S.	584,350	-	-	218,350	265,850	116,500
Total	1,440,600	-	-	1,797,950	1,097,300	847,725

* As defined by Federal Power Commission

Fig. 11—Total Capacity for Manufacture of Steam Generators

Showing Capacity of Equipment on Order as of May 1, 1949, Scheduled for Shipment; and Open Capacity for Manufacture of Additional Equipment for Delivery in Years Indicated

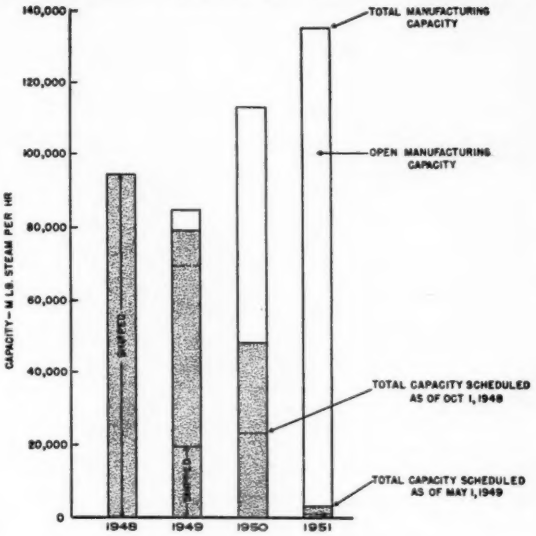


Fig. 12—New Steam Generator Capacity

Shipped and on Order as of May 1, 1949, Scheduled for Shipment—Capacity in 1000 Lb Steam Per Hr: Units of 450 Psi and Over

	1948 (Shipped)	First 4 Months of 1949 (Shipped)	Last 8 Months of 1949	1949	1950	1951
Continental U.S. Utilities	67,948	15,359	45,032	60,371	41,871	1,630
Continental U.S. Industrials	20,697	3,124	9,467	12,591	1,870	-
Outside Continental U.S.	5,920	1,291	5,540	6,831	4,102	1,475
Total	94,565	19,754	60,039	79,793	47,843	3,105

(*Continued from page 227*)

by sound judgment and a full realization of its responsibilities.

I would like to emphasize the need of maintaining an economic and coordinated balance from an operating standpoint between thermal and hydraulic generating capacities in order to assure economic and adequate electric power supply in the face of adverse precipitation. This need is attested to by the fact that in most instances where restrictions on use have occurred, it has usually been in those areas where there is a large amount of hydro capacity. This is true not only in the United States but in other countries as well. I believe firmly in the development of water power resources to the extent that they are economically sound and bear their proper share of the costs involved.

Flood control, irrigation, and navigation are influencing factors in deciding the justification of a project. These must be carefully examined so as to avoid possible wasteful expenditure of economic resources which could otherwise be put to a better use and, thus, improve the economy of the country. In every case, there should be a clear and full understanding of the facts involved so that the public may be properly enlightened. Only by so doing can there be a constructive approach to the problem of the Federal Government's expansion in the electric power field.

Need New Government Power Policy

There is an urgent need for the determination of an electric power policy on the part of our Federal Government. In certain areas, the Government has now assumed responsibility for development of our water power resources. It is extremely important, also, that areas of hydro generation be fully coordinated in operation with areas of thermal generation, wherever this is physically possible both within broad areas or between adjacent areas. There are already outstanding examples of accomplishment of this kind of coordination. Only by such measures can maximum benefits to the country as a whole be achieved.

At present, the two great sources of energy for electric power generation are: (1) thermal energy from the burning (a chemical reaction) of gaseous, liquid, and solid fuels; and (2) the hydraulic energy of falling water.

In planning for the future addition of generating capacity to the electric power systems, it is reasonable to expect that the use of the conventional sources of thermal energy are envisioned for a long time to come. It is not to be expected that the new source of heat energy (a nuclear reaction) from atomic heat power reactors will be available in appreciable quantities for extensive use in power plants until after many years. If power reactors are to be used as a source of heat energy, they must be competitive with the conventional

Fig. 13—Total Capacity for Manufacture of Hydraulic Turbines

Showing Capacity of Equipment on Order as of May 1, 1949, and Scheduled for Shipment; and Open Capacity for Manufacture of Additional Equipment for Delivery in Years Indicated

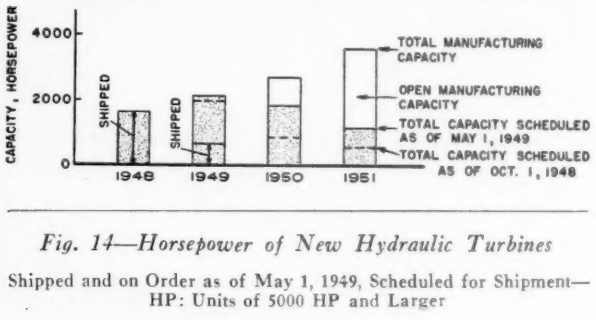


Fig. 14—Horsepower of New Hydraulic Turbines

Shipped and on Order as of May 1, 1949, Scheduled for Shipment—HP: Units of 5000 HP and Larger

	1948 (Shipped)	First 4 Months of 1949 (Shipped)	Last 8 Months of 1949	1949	1950	1951
Continental U.S. Utilities and Industrials	1,373,175	490,600	1,268,350	1,758,950	1,787,800	1,138,500
Outside Continental U.S.	246,200	-	-	409,950	58,600	-
Total	1,619,375	-	-	2,168,900	1,846,400	1,138,500

Fig. 15—Total Capacity for Manufacture of Power Transformers

Showing Capacity of Equipment on Order as of May 1, 1949, and Scheduled for Shipment; and Open Capacity for Manufacture of Additional Equipment for Delivery in Years Indicated

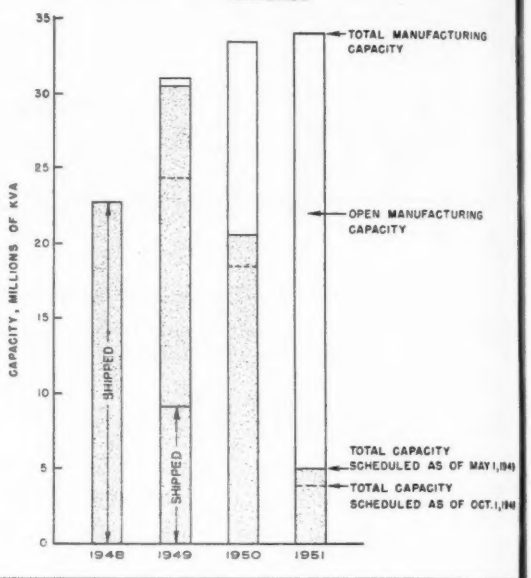


Fig. 16—New Power Transformer Capacity

Shipped and on Order as of May 1, 1949, Scheduled for Shipment—Kva Capacity: Units of 500 Kva and Larger

	1948 (Shipped)	First 4 Months of 1949 (Shipped)	Last 8 Months of 1949	1949	1950	1951
Continental U.S. Utilities and Industrials	21,643,000	8,500,000	20,681,000	29,181,000	20,657,000	4,010,000
Outside Continental U.S.	1,221,000	-	-	1,302,000	1,430,000	989,000
Total	22,864,000	-	-	30,483,000	22,087,000	4,999,000

Fig. 17—Cumulative Generating Capacity of Water Wheel Generators and Hydraulic Turbines

On Order as of May 1, 1949, and Scheduled for Shipment—Continental U. S. Only

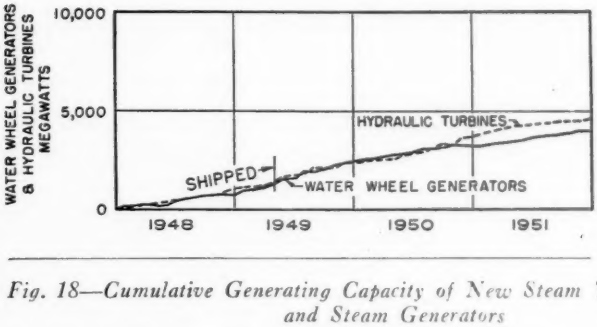
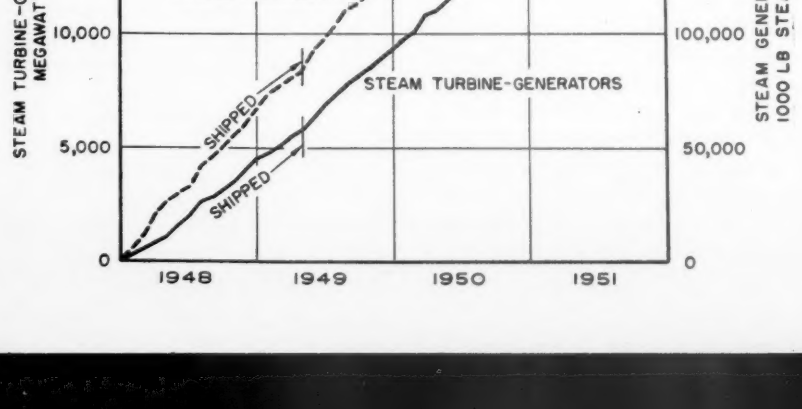


Fig. 18—Cumulative Generating Capacity of New Steam Turbine-Generators and Steam Generators

On Order as of May 1, 1949, and Scheduled for Shipment—Continental U. S. Only



sources of thermal and hydraulic energy and must be a safe and practical reality.

For the present, we can assume that new electric generating installations now being made will undoubtedly serve their economic life before this new source of heat energy will have a large influence over future developments. It is to be hoped, that in the development of atomic energy for electric power generation, our industry will be able to take an active part in the same way it has pioneered in bringing our industry to its present stage of development.

In closing I would like to thoughtfully leave with you the following conclusions:

1. The existing electric power resources of the United States are the largest in the world, accounting for almost one-half of the total production and consumption for all nations and nearly six times that of the next nearest nation, the

U.S.S.R. These resources are being expanded at a rate far beyond that of any period of the industry's 66 years of outstanding development. For our country with a population of 7 per cent of the world's total, it is one of the major components of our great American industrial system. It is one of our greatest sources of strength for both peace and security.

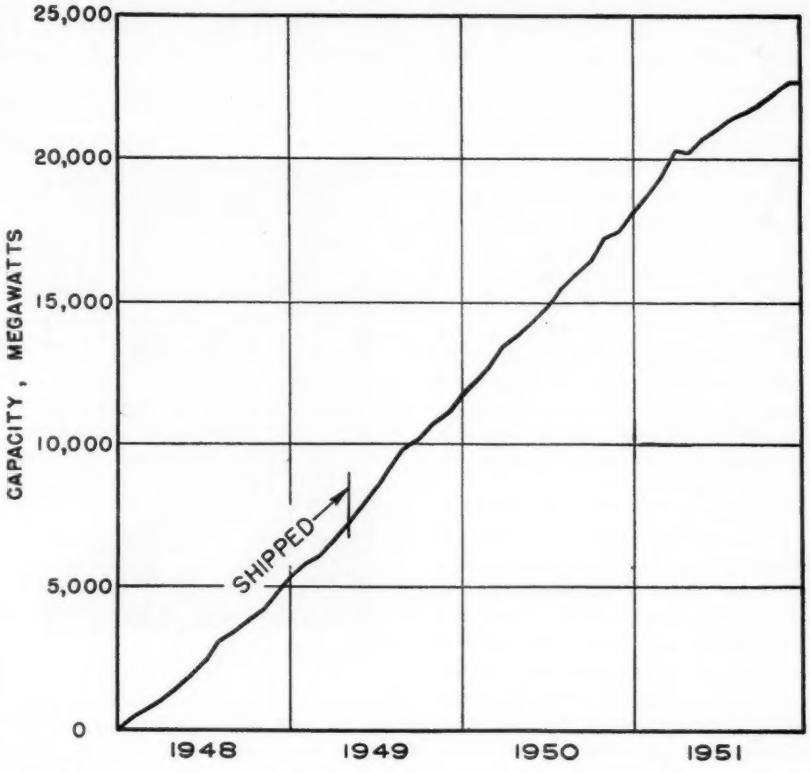
2. The wartime record of the electric power industry was of the highest order. Every requirement for war production and essential civilian needs was met, and in adequate quantity. It was a record of outstanding cooperation both within the industry and between the industry and government. The power industry's resources were mobilized effectively and courageously. No one power region of the country contributed more to vital war production than another.

3. The postwar period, with its unprecedented load growth, has made necessary an even greater marshalling of existing equipment than ever before. It is an accomplishment which merits the approval and support of the many millions of fair-minded Americans. Generating equipment and other facilities have been coordinated, pooled, and operated to an extent almost beyond belief. No amount of biased ridicule, no attempted efforts to discredit the good work of our industry can change the fact that a great task has been successfully carried out. It is to the everlasting credit of the people in the industry that this has been possible. It gives one faith in the continuation of a free America and a bulwark against the spread of "isms" foreign to our way of life.

4. Our wartime and postwar achievements and advancements in the field of electric power are an inspiration for other nations allied with us who are endeavoring to stimulate their recovery, strengthen their national economy, and raise their standard of living. Our operating practices, our engineering improvements, our construction methods serve to demonstrate the technical assistance which other nations less fortunate than ourselves may use to their advantage.

Fig. 19—Cumulative New Generating Capacity of Steam Turbine-Generators and Water Wheel Generators

On Order as of May 1, 1949, and Scheduled for Shipment—Continental U. S. Only



5. The electric power industry will go forward with undiminished vigor, initiative and courage. Great as have been past accomplishments, they can be even greater than before. The establishment of a wise and constructive policy of our Government toward our industry can do much to enable the electric power industry to assist, along with other industries, in promoting and insuring the social, economic, and political stability of our country. That is a purpose which is worthy of the thoughtful consideration of all who believe in the democratic principles of life, liberty, and the pursuit of happiness.

Ebasco Holds Second Safety Seminar

SAFETY and personnel executives from utilities in ten states and in Brazil, Cuba and Mexico recently attended the seminar in Public Utility Safety, held June 13 to 24, and sponsored by Ebasco Services, Inc. in cooperation with New York University.

In addition to the lecture courses, which were given at New York University on Washington Square and at the 2 Rector Street offices of Ebasco, field trips were made to Fort Jay where the group was briefed on the driver training program of the First Army, to the training school of the New York Telephone Company at Long Island City and to the Waterside Plant and Fire Protection School of Consolidated Edison Company of New York, Inc.

The Association Panel, a unique feature of the seminar, was held at headquarters of the American Gas Association, 420 Lexington Avenue. Representatives of the accident prevention activities of the American Gas Association, Edison Electric Institute, American Transit Association, American Institute of Electrical Engineers, American Society of Safety Engineers and the National Safety Council, outlined the work of their respective associations in the field of safety and answered questions of the seminar group.

Standardization—An Investment

By A. C. Monteith
Vice President, Westinghouse Electric Corporation

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 1, 1949

ALL of us favor standardization until we have to give up our own ideas. This is a natural reaction because as engineers we take pride in being originators and improvers and do not like to be held to a confined course. However, we are being compelled to recognize the impact of volume production methods in reducing costs. Handmade products are no longer the hallmark of quality, and our engineering thinking must shift accordingly.

Standardized Vs. "Handmade" Products

There are always many ways to make something. Modern highly-tooled manufacturing makes it possible to take a design which may be short of the ideal —engineering-wise—and come out with quality products at lower cost, in comparison with scattering production effort among the several ways that might actually be better when viewed solely from the standpoint of individual engineers doing "handmade" type of thinking.

All of you are in the squeeze between load growth and shortage of investment funds. You are under pressure to keep investment down. Your Committee, feeling that standardization offers significant opportunity for relief and that the utility industry has possibly not practiced what it has preached, asked me to evangelize on this subject and advocate action instead of words.

Standardization has been criticised by some, because the results have not been clearly evident. It is not easy to see the benefits of standardization at a time of rising labor and material costs. And it has been true in the electrical industry that most standardization has been accomplished during rising markets when deliveries have been longer on special equipment as a result of a shortage of engineers, draftsmen and tool makers.

Automotive Standardization

To see the benefits that we have achieved requires a comparison with some industry such as the automotive business, where standardization has

MR. MONTEITH

long been thoroughly practiced and, therefore, the major gains from it have been realized. Here we find the comparative results startling. Comparing 1948 with 1939 figures, automotive wages have risen 82 per cent, materials 90 per cent, and car prices 89 per cent. In the electrical manufacturing industry, where standardization is just being felt, wages are up 90 per cent, materials 76 per cent, but prices are up only 38 per cent as compared to 89 per cent increase in car prices.

Increased Volume, Reduced Costs

One concludes that electrical manufacturers have had a certain amount of standardization accompanied by volume to act as a brake on rising prices. Without it, electrical prices would have risen even more. A greater adherence to standards, especially in times of lower business levels, can bring fuller advantages to the industry by increasing volume and thereby reducing costs of electrical equipment.

Volume production is essential. This is illustrated by the experience with a 1500-hp, direct-current motor built during the war. Because the order called for over 800 machines, special jigs and tools were justified. These eliminated such operations as brush-rigging adjustment, interpole adjustments, individual seating of the brushes, and so on. In this way the cost was materially reduced below what it would have been if only two or three of these machines had been built on a single order. For heavy electrical equipment this is, of course, an extreme case of volume production, and in general it is not possible to do as well on commercial orders. It does, however, illustrate the possibilities.

Two Kinds of Standards

There are many varieties of standardization, but, at the moment, we will concern ourselves with only two. One class embodies those standards which each manufacturer sets for himself so that he can achieve a reasonable measure of quantity production.

For example, we have developed a family of handles that serve a variety of breakers, switches, and control elements. Likewise, we have a standard size and location of drain plugs, valves, etc., for oil-filled apparatus that enables us to stock standard parts, and to simplify drawings and manufacturing operations.

The other class under discussion, which we will call industry standards, comprises those which users and manufacturers in a given field develop cooperatively. Circuit breakers, distribution transformers, and steam generator units are in this category. These, if followed, are the most effective brand of standards, as both user and manufacturer have crystallized a common point of view.

Manufacturer's Standards

Both classes of standards are important, and because of their money-saving qualities they merit your firm support. For example, consider the seemingly insignificant matter of the drain plug in a circuit breaker we cited a moment ago. "How," you say, "can a ten-cent plug have any real effect on the true cost of a $10,000 product?" But listen. Take the actual case of the drain plug on the tank of a 50,000 kva circuit breaker. In order to meet customer demands, we may have to provide a ½, ¾ or 1-in. drain plug or a drain valve, a

special sampling valve or a special oil gauge. In the past 15 weeks we have been required to manufacture this particular tank in eight different combinations of details.

Under modern manufacturing methods we cannot use the "handmade" method of having someone take a new plug of different size—which we probably don't even stock—down to the shop and say to Joe, the workman, "Put this odd-size plug there instead of where the drawings call for it." Manufacturing setups established to capitalize on volume require more formality. This detail change has to be handled through the order routine and costs about as much as handling a new order. Drawings have to be changed. The new material purchased, and with appropriate instructions all in writing, Joe can then screw in the new plug. Cumbersome? Yes. But short-cut it and you get confusion.

The cost of this minor change may well total $100 to $200. "But," you say, "such a charge is exorbitant,"—and besides you have never been asked to pay it. True. But it is there just the same and must be made up in the over-all, aggregate cost level of the apparatus. A charge of this magnitude is seldom made directly. Perhaps it should be. It would make the economic loss of seemingly trifling deviations from standard more apparent. But accounting systems are not set up to do this—and if they were, that variation from standard would increase the cost even further.

Unit Substations

The unit substation is an outstanding example of how the manufacturer can help reduce your system investment by combining all the elements for distribution substations into a few standardized coordinated units. Increasing construction labor costs have greatly stimulated the use of unit substations. Much of the merit of the unit substation idea comes from the single responsibility, the integration of component design, over-all manufacturing coordination, and factory testing, possible only when a single manufacturer does the whole job.

Conversely, the unit substation principle loses much of its benefit if an attempt is made to replace some elements of a manufacturer's standard unit substation with elements of some other make. Some distribution-system engineers may wish to do this, thinking to combine the best features of different manufacturers. This clearly defeats the unit substation idea and must be resolutely avoided as the losses far outweigh the gains.

Industry Standards

General features of unit substations need to be standardized from both the user's and the manufacturer's point of view. Actually, every major user has a standard of his own. This was to be expected in the initial mushroom-like growth of this new approach to the substation problem, but now sufficient experience is available to standardize.

However, let us not standardize on everything and thus get no production volume benefit. Let's select one or two of the ways of killing this cat and discard the others instead of trying all nine ways. Useful suggestions in this regard appeared in the February-March issues of the EEI BULLETIN this year. Mr. E. B. Shew states that sixteen distribution substation layouts which he examined could, in his opinion, with a little concession and compromise, have been reduced to three. Our own observation confirms this. In the second article, Mr. W. M. Hanna shows how a variety of assemblies, to suit different operating conditions, can be made up of standard components.

Standardized Bus and Connection Arrangements

We feel that the utilities could help themselves materially by adopting standardized substation bus and connection arrangements, such as are discussed in Mr. Shew's article, as well as standard operating procedure in such matters as grounding, testing, phasing of cable circuits, and the testing of relays. At the present time, the practice on these items is completely non-uniform with operating companies, and this handicaps the manufacturers in developing devices which will suit even a small percentage of the users.

We know of one company that has three different testing and grounding methods of their own and two methods of testing relays. Another item on which not too much standardization work has been done is outdoor substations built of structural steel members.

An outstanding example of a general industry standard more fully developed is that of steam-turbine-generator units, which was approached with skepticism in many quarters. Here the steam pressure, temperatures, bleed points, and kilowatt ratings of all turbine generator units from 11,500 to 60,000 kw have been standardized on. Already acceptance has been excellent. Over half of all machines falling within these boundaries on order are standard—proving that if anything so difficult can be brought into the standardization fold, in no field of heavy apparatus is standardization hopeless.

Turbine-Generator Standardization

Turbine-generator standardization, furthermore, well illustrates the several merits of standardization generally. These can be enumerated as follows:

1. Both users and manufacturers have been able to plan ahead. This is of special importance when engineering and drafting talent are in short supply. Drawings can be had soon after purchase. In the case of a second installation, the user frequently needs to modify only the foundation and building drawings in minor ways to suit a new location.
2. Machines are more reliable because they have been "debugged" in actual service. Regardless of the experience of the builder, the first one of a kind always requires some minor changes or adjustments on the site. Service experience is required to shake down a new model of any machine, whether it be an airplane or a turbine.
3. Delivery schedules are less likely to be interrupted when there is a flow of critical items coming through. A defective forging discovered during machining operations can be replaced by the next one in the flow line, etc.
4. Repair parts can be obtained more quickly.
5. Workmen in the factory improve in proficiency as their work is repeated.
6. Experienced design engineers—and their number is limited—can devote their time to creating and developing the new machine that will be the next improvement within the standardization framework.

The experience with turbine generators also demonstrates that standardization does not freeze development. Each manufacturer, in fact, has more time

to improve blade materials and construction, to develop better steam flows, or any of the thousand-and-one ways by which he tries to make his standard machine better than his competitor's standard machine.

Steam-turbine-generator units, although conspicuous, are by no means alone in the field of power apparatus standardization. Good work has been done on street-lighting fixtures since the war by the EEI-NEMA Committee. Voltage ratings, lamp sizes, lamp bases, and light-center distances have been established. Mounting details, street-lighting pole dimensions and photometric test procedure have also been standardized.

These standards—if adhered to—will permit manufacturers to set up for volume production. Users can interchange essential components regardless of the original manufacture, thus keeping stocks to a minimum. It also permits flexibility in maintenance in that reflector and head assemblies can be interchanged freely.

Adherence to Standardization Programs

And this brings to mind one essential fact, which, by the way, is the real reason I am here. A standardization program—for all the effort and expense poured into it—is no better than the actual adherence it receives. Many utilities have not as yet agreed to follow these well-worked-out lighting standards in their own procurement. Frequently, this has been due to some individual who is not taking the broad-gauge viewpoint that his own executives had in mind when they authorized the expense of the Committee work.

On distribution transformers we have much the same situation as with lighting. ASA technical standards were brought up to date in 1945, and with the acceptance of the EEI-NEMA Joint Report, standardization has now been agreed upon. It is true that there are far too many different standard arrangements included, both electrical and mechanical, *but if these standards can be adhered to*, a substantial industry gain will result. Every effort toward further simplification should be made.

Well under way is similar standardization on power transformers 501-10,000 kva, 3 phase, or 501 to 5000 kva, single phase, up to and including 69,000 volts. Your support in keeping the number of standards to a minimum is needed.

An example of cooperative standardization and of the progress that can be made, if the utilities and manufacturers set their collective minds to it, is the work being done in the preferred ratings of power circuit breakers. The new Standard C37.6 published this year shows a reduction in the number of ratings of circuit breakers from 121 in the 1945 list to 82 in the new list. This has not been an arbitrary reduction but is based on actual usage during the five-year period. We are hopeful that in the course of time even this figure can be further reduced.

We must never forget that your customers who push buttons and like to live electrically do not care how you get electricity to their homes as long as you do it economically. Individualistic design changes back in the system somewhere mean nothing to them.

Standards to last for a reasonable length of time and be accepted must be based on sound engineering and not be purely arbitrary or commercial. In adopting a standard, good judgment must be used so that the standard can be maintained for a long enough time to amortize the tooling for volume production. During this period, improvements are accumulated and put into effect at the next step in standardization effort instead of being adopted piecemeal.

The cases cited show that those who have planned the codes of standards have given us a good beginning. The extension of standardization into fields not now covered—and there are several of these—should proceed in an orderly way. Gentlemen, the great crying need today is not to rush forward into an accelerated program of creating new standards, but to accept in fact, not just in theory, the standards already on the books.

Now, when we have definitely returned to a buyer's market it is difficult for an engineer to resist the urge to bargain for something special, something not quite standard, in order to achieve some local need, fancied or real. It is even more difficult for the manufacturer, in periods of low business activity, to resist that request because, not only does he need the business, but also he does not wish to jeopardize the over-all, and perhaps sizeable, order.

The customer engineer, by winning from the manufacturer an agreement to something beyond the standard, may indeed take pride in this horse-trading, feeling he has achieved some gain for his company by so doing. Nothing is farther from the truth. The inescapable result is an increase in costs. They may be hidden costs, impossible to totalize, but they are none the less real. They inevitably must be taken into account and play a part in establishing cost levels all out of proportion to their transitory worth. In this respect, manufacturers are at your mercy.

Everyone, from the president down, who is anxious to keep investment costs down, must not only encourage the establishment of standards but also must insist that his people abide by them. You, gentlemen, the final users, pay for every successful attempt to sabotage either a manufacturer or an industry standard.

Indiana Electric Association's Ninth Annual Young Men's Utility Conference

BELIEVED to be a unique event in the nation's electric industry, the ninth annual Young Men's Utility Conference, sponsored by the Indiana Electric Association, was attended by over 225 young men, of 35 years of age and under, during the two-day meeting on May 2 and 3, held in Ipalco Hall, Indianapolis, Ind.

H. T. Pritchard, president of the host company, Indianapolis Power & Light Co., welcomed members and guests at the opening session on May 2, which was presided over by C. W. Kroener, Southern Indiana Gas & Electric Co. In his opening remarks, E. D. Anderson, vice president of the IEA and of the Northern Indiana Public Service Co., stated that "the electric utilities must employ three times the number of young men in the next fifteen years than they have employed in the past fifteen years, if we are to maintain the present engineering personnel.

Following the opening speech, Edwin Vennard, vice president, Middle West Service Co., addressed the conference on "Rising Costs and Electric Rates."

P. L. Smith, president of the National Association of Electric Companies, continued the session, citing exemption

(*Continued on page* 260)

The Present and Future of Thermal Prime Movers

By Charles W. E. Clarke

Vice President and Consulting Engineer, United Engineers & Constructors Inc.

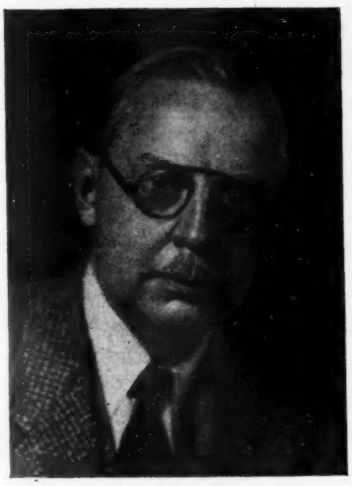
An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 1, 1949

THERMAL prime-mover development has been in process for the past several hundred years. As most of us know, Hero's reaction turbine dating back to 120 B.C. was the first disclosure of a machine which could be termed a prime mover; but development of power from steam, or heat, made no perceptible progress until the time of James Watt, about the middle of the eighteenth century.

Reliable, Efficient Machine

From the time of Watt's by no means small beginning up to the start of the twentieth century, the reciprocating steam engine developed into a reliable, fairly efficient machine. Reciprocating-engine units of about 5000-kw capacity were put in service about that date and were considered large units. During the same period many large pumping-engine installations materialized, most of them triple-expansion. And, also in the late 1890's and early 1900's, there were several steam-turbogenerator installations in sizes of 1000 kw to 1500 kw.

In short, active development of thermal prime movers as power generators for utility services did not start until about the turn of the century, but the progressive evolution which had been going on meanwhile demonstrated itself almost overnight in construction of units of continuously increasing size. In 1903, Fisk Station of Commonwealth Edison Company saw the operation of a 5000-kw



MR. CLARKE

vertical Curtis turbine. Since that time the pace has been amazingly rapid until, today, one unit is operating in this country with a capacity of 200,000 kw—and there is the possibility of larger units being constructed should it prove desirable or necessary.

During the early development period, inventors were intrigued with the idea of producing a so-called rotary engine, in order to get away from the reciprocating motion connected with the steam engine. Nothing was accomplished, but this activity probably had some effect on the turbine developments. Two important elements should be borne in mind in connection with the rapid advance of the steam turbine; first, it had all the benefits of the engineering knowledge, thermal improvements, and shop practices which went into the development and construction of the modern steam engine; and second, the steam turbine is a thermal machine capable of fairly rational theoretical analysis throughout its entire cycle, both thermal and structural. These factors, without doubt, all contributed to the rapid increase in sizes of machines during the last forty years.

Total Production of Electricity By Public Utility Plants

Fig. 1 shows, for each year, the kilowatthours produced by the utilities of United States from 1906 to 1948, including both public and privately-owned companies. Note that the total current production from 1906 to 1919, inclusive, was exceeded in the single year, 1948.

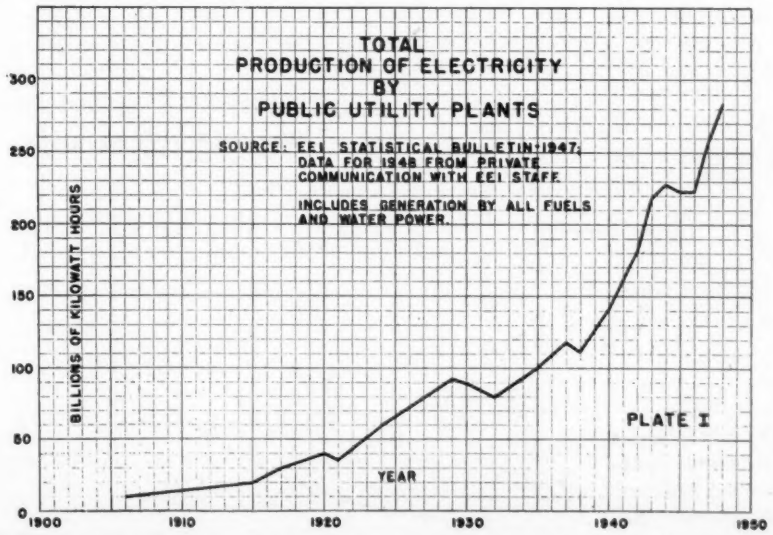


Fig. 1—Total Production of Electricity by Electric Utility Plants in U. S.—1906-1948

Installed Capacity and Maximum Demands in Public Utilities

Fig. 2 shows installed capacities and peak loads of utility systems, for each year, from 1906 to date. After World War I, there was a period of several

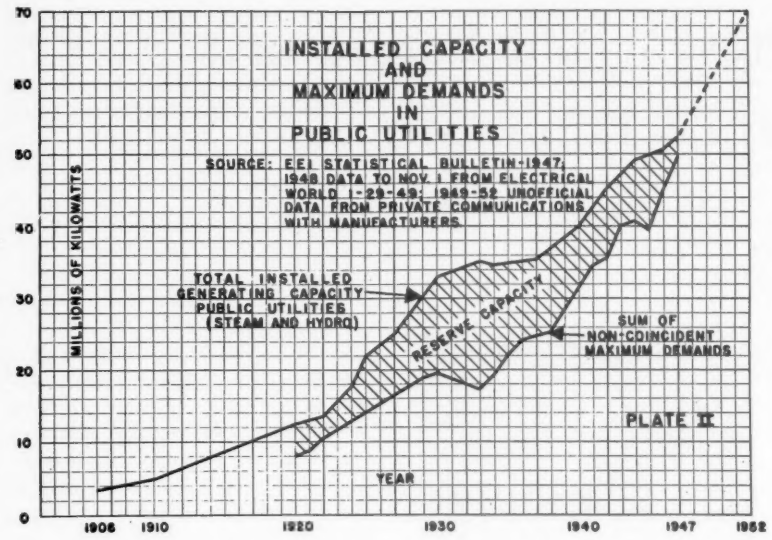


Fig. 2—Installed Capacity and Maximum Demands of Utility Systems—1906-1952

years when installed capacity was considerably in excess of demand. It will be interesting to see if this same differential occurs in the next few years, subsequent to operation of the unusual capacities now being installed.

Figs. 3, 4, 5 and 6, show that available sizes of turbines and boilers, and allowable pressures and temperatures (which have been constantly increasing) have in great measure controlled and made possible the tremendous expansion in utility-system capacities.

An important factor in construction of large units, particularly the boiler portion, has been the improvement in welding technique. It is safe to say that without present-day welding practices, boilers with capacities of 1,000,000 lb per hr, pressures up to 1200 and 1500 lb, and temperatures of 1000 F or 1050 F, would never have been built.

The old type of riveted construction, and former methods of building superheaters and reheaters, would not have permitted it. The first welded-drum boiler was installed in this country in 1930. From that date on, riveted-drum construction passed very quickly out of the picture.

Reheat

Up to about 1925, there had been a steady increase in unit sizes and also in the permissible pressures and temperatures at which they could operate. But 700-750 F was considered the maximum temperature limit for materials then available for manufacturing superheaters, piping, and high-speed rotating units. It was about this time that reheat appeared on the scene, with resulting developments which reduced heat consumption of prime movers materially, while not increasing the initial temperature at the prime mover. Meanwhile materials had shown a constant improvement with the consequence that, about 1934, steam temperatures started to increase.

By 1938, temperatures of 950 F were allowable, making it inadvisable to continue using a reheat cycle since the required economies could now be secured without the complications attending reheat. At the present time 1000-F inlet temperature is becoming rather common usage with pressures of 1250 lb and higher, and a number of installations are under way which will operate at 1050 F—two are already operating at that temperature, which for the moment seems to be the maximum limit. So, again reheat is in the picture.

As an historical side line, it can be pointed out that use of reheat on steam prime movers is not particularly new. James Watt, in the course of his engine experiments, took out a reheat patent covering steam-jacketing of cylinder walls to prevent condensation in the steam cylinder. Reheat was also common along with the development of the large compound and triple-expansion steam engines in vogue in the late 1890's and early twentieth century. Most of the important installations had steam reheaters, reheating steam between the high and low-pressure cylinders. The principle is the same except that, in present-day prime movers, reheat is used more broadly in that, while some early reheat units were provided with steam reheaters, without exception the reheaters of today are actually secondary superheaters in the boiler. Temperatures are usually raised back to the initial temperature, or very nearly there.

The case for or against the thermal advantages of reheat can be covered in a few words. Assuming the maximum desirable operating temperature to be 1050 F, a unit operating on a reheat cycle and reheating back to 1000 F or 1050 F, as conditions may warrant, will produce economies comparable to those secured if the initial temperature were 1200 F without reheat—a temperature not advisable at this time.

Developments are now in progress

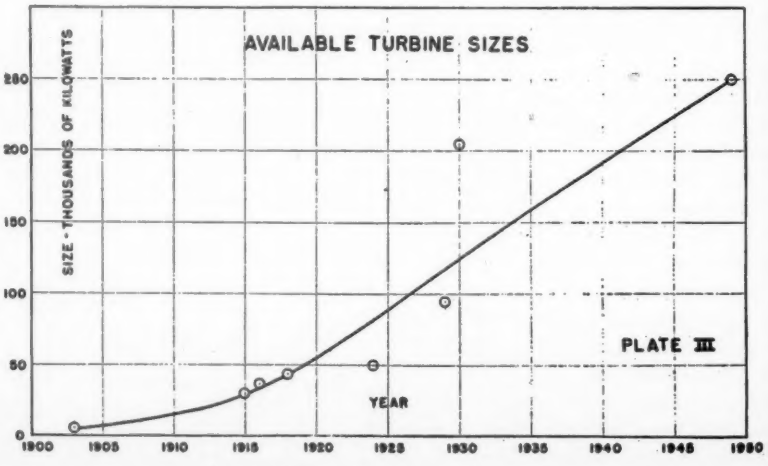


Fig. 3—Available Turbine Sizes—1903-1949

which may permit use of considerably higher temperatures and again make it inadvisable to consider reheat installations. Actual production of steam temperatures in the neighborhood of 1200 F presents a real problem to the boiler manufacturer, and at elevated temperatures somewhat different construction from that now customary would have to be adopted.

Investment Considerations

From the investment viewpoint, the matter of whether or not to use reheat must be settled for each case, and depends somewhat on the size of the units involved, the cost of coal, and the type of load which can be assured the unit. In the larger-sized units, in the neighborhood of 100,000-kw capacity, the increased cost of a reheat over a non-reheat installation is of small magnitude. With units half the size, say 50,000-kw capacity, the increased cost might amount to $10 to $12 per kw.

As another side note, in the previous wave of reheat installations a total of about 60 units were installed. There are now on order 60 turbine units which will operate on a reheat cycle, with a total capacity of about 3,500,000 kw.

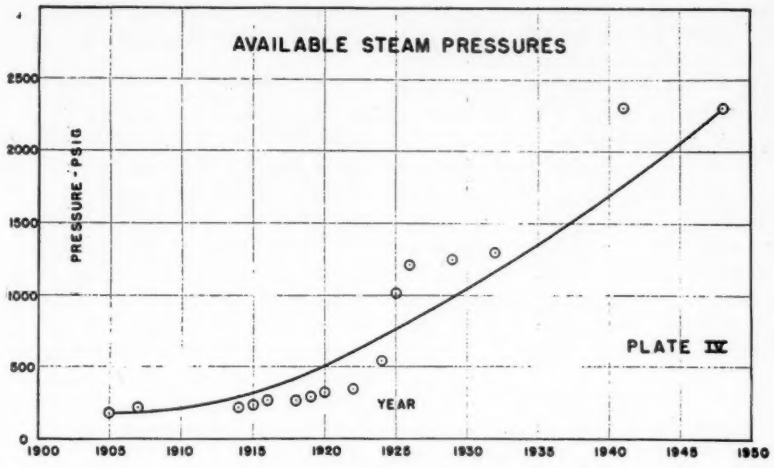


Fig. 4—Available Steam Pressures—1905-1948

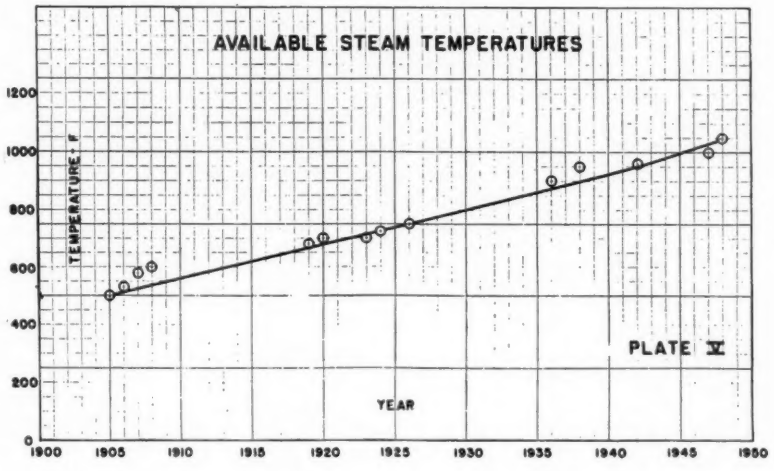


Fig. 5—Available Steam Temperatures—1905-1948

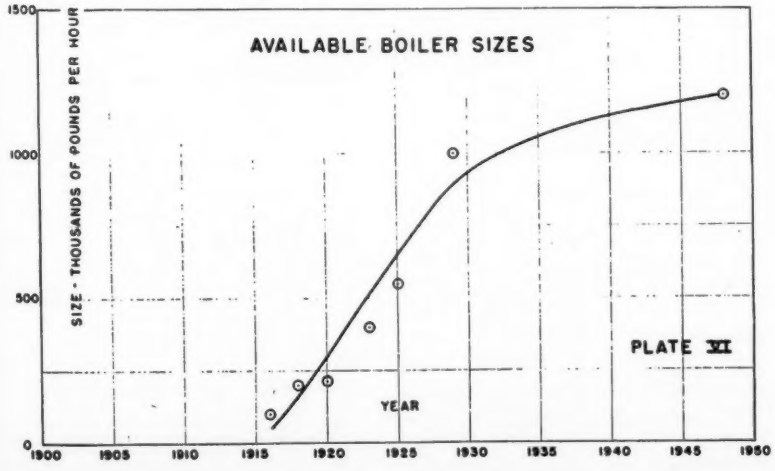


Fig. 6—Available Boiler Sizes—1916-1948

Generator Developments

It has been essential that developments in the generator end of turbo-generator units keep pace with those in the prime mover. In 1937 the first hydrogen-cooled generator was put into service; today, hydrogen cooling in units of 20,000-kw capacity and over is universal.

Hydrogen pressures for generator cooling started out originally at ½ psi, with the units designed in most cases for operation at 15 psi to take care of differences in power factors, temperatures, etc. Today, machines are being designed to operate at 30 psi, and several are now operating, although not as yet at the 30-lb maximum pressure. The kva-gain between 15 psi and 30 psi is about 10 per cent. Naturally, this gain is of no use on a capacity basis at high power factors unless the prime mover is large enough to drive the generator at the increased load.

In southern sections, where temperatures of cooling water are apt to be high, the increased hydrogen pressures have proved of inestimable advantage, and generator cooling should cease to be a problem.

Higher generator voltages, in the

neighborhood of 13,200 v, are in general use today, and on systems where large units are involved and no local distribution is required, generator voltages on the order of 16,000 v should be given serious consideration.

Excitation voltages have been increasing. Not along ago 125 v was considered standard; nowadays 250 v is standard and on a number of the larger machines, exciters of 375 v have been used. In general, direct-connected exciters are in favor, most of them operating at 3600 rpm.

Topping Units

In the past twenty years a relatively large number of "topping units" have been installed. Defining the term briefly, a topping unit consists of a high-pressure turbine and boiler with the turbine exhausting at low pressure, say 200 psi to 300 psi, to the old low-pressure turbogenerator units. This type of installation is an excellent device for modernizing older installations because of two factors: it is possible to reduce by 25 to 35 per cent the over-all heat rates of the units affected; and, where the circulating-water supply is limited, the generating capacity can be increased appreciably without placing further load on the circulating-water system.

There is a practical limit on how much topping capacity should be installed on any utility system, and, moreover, topping should be applied only if the low-pressure elements to be topped are in sufficiently good condition to warrant their reliable operation for a number of years to come. It should be borne in mind that costs per kilowatt are materially greater for topping units than for straight-through condensing installations of like size because of the greater boiler capacities required.

Regenerative Feedwater-Heating Cycle

In the early 1920's, the regenerative feedwater-heating cycle came into vogue; it consists of extracting steam from specific points in the turbine (the steam having done considerable work up to those points) and utilizing it in feedwater heaters through which condensate is passed, heating the feedwater to a predetermined final temperature. The cycle, thereby, absorbs considerable latent heat from the steam to the feedwater which would otherwise be lost in the condensing water and discharged into the river. Regenerative feedwater heating permits a saving of from 12 to 15 per cent in the energy required to run the turbogenerator unit.

Steam-Cycle Limitations

Steam cycles are subject to specific limitations as to obtainable efficiencies. At a pressure of about 3200 psi, steam becomes fluid. The maximum steam pressure considered available for use in steam-generating plants is in the neighborhood of 2500 psi. At this pressure, with a multistage, regenerative, feedwater-heating system, a temperature of 1050 F, and reheated to 1000 F, the net obtainable thermal efficiency would be between 36 and 38 per cent. But these percentages are controlled by two factors:

1. *Stack losses.* Present-day maximum boiler efficiency, having in mind cost of construction, is about 90 per cent, 10 per cent of the total energy in the fuel burned in the boiler being discharged into the atmosphere.
2. *Condenser losses.* That is, losses caused by transfer of the latent heat in the condensed steam to the condensing water and its consequent loss to the river. This loss amounts to about 50 to 55 per cent of the total fuel burned in the boiler system.

Mercury Cycle

W. L. R. Emmett evolved the "binary cycle," a combination of mercury and steam boilers and turbogenerators. Starting in 1923, several installations were made and, at the time of the cycle's development, it looked particularly attractive as the available heat rates were considerably better than was possible with materials then available for steam-plant cycles. But in later years developments in metals resulted in a steam-cycle improvement also, and the mercury cycle today, except in special cases, would not seem to be especially attractive.

Gas Turbines

The gas turbine is in fact a rather old idea. The principal difficulty encountered in its early design was the apparent impossibility of building a compressor to any degree efficient in its relation to the rest of the unit. In other words, the compressor took about all the power the gas turbine developed. However, in recent years there have been intensive developments, particularly in Switzerland, where several manufacturers have built, and have in operation, gas turbines of considerable size, the largest one reported having a capacity of 27,000 kw.

Up to the end of World War II, there had been no comparable developments in this country. But, recently, manufacture and usage of gas turbines have shown perceptible progress here—a result of wartime-development work in turbosuperchargers and jet engines for aviation use, and the parallel development in suitable metals for the high temperatures encountered in a gas turbine.

Gas Turbines For Utility Service

Outside of locomotive applications there are on order or in use, for utilities' service, 7 gas turbines:

3—3500-kw units
3—5000-kw units
1—1875-hp unit

The 3500-kw units are all simple open-cycle type. The first of these three units is to be installed at Arthur S. Huey Station, Oklahoma Gas & Electric Company, and is scheduled for operation early in June. The open-cycle gas turbine has a comparatively large heat loss in the exhaust and it will be economical in some cases for the heat in the exhaust gases to be transferred to a waste-heat boiler for production of low-pressure steam, either for plant uses or for space heating. At the Arthur S. Huey Station it is being utilized for feedwater heating.

The three 5000-kw units are designed for closed-cycle, regenerative-type operation.

The 1875-hp unit is to be used on a natural-gas line as prime mover for operating a booster pump.

All of the above units are using either oil or gas as fuel.

Gas Turbine Thermal Efficiencies

One interesting thing about the gas turbine is the fact that, in a small unit, thermal efficiencies can be obtained which far exceed those obtainable from any commercial installation of like size which would be made on a steam cycle.

While the gas turbine has specific limitations as to attainable efficiencies, its type of construction is such as to permit safe operation at much higher temperatures than are now possible with the steam cycle.

The fundamental difference between gas-turbine and steam-turbine construction lies in the fact that the former operates at relatively low pressure and the

metals are thin; while in the steam cycle, where pressures are very much greater, thick, complicated castings and forgings are required—which introduces major problems. With temperature varying with load and resultant steam-temperature gradients, internal stresses and possible distortions ensue. Further, certain types of materials used in gas-turbine construction are not now procurable for the heavy castings and forgings needed for the steam cycle.

Adaptation to Coal Burning

For the gas turbine to be fully acceptable and useful to the utility industry at large, as well as in those locations where oil and gas are natural fuels, it will have to be constructed so that it can burn solid fuel, i.e., coal. Such a proposition involves real difficulties. The Locomotive Development Committee of Bituminous Coal Research, Inc., headed by John I. Yellott as Director of Research, has been working for some time on a program sponsored by a number of the railroads in the United States, to the end that the gas turbine be made adaptable for use of pulverized fuel.

The difficulty in this particular proposition is that the fly ash must be removed from the gas stream after leaving the combustors and before entering the turbine. Although this is a problem which has not yet been fully ironed out, progress is being made. At the present time four gas-turbine locomotives are in process, two being sponsored by Bituminous Coal Research, Inc. and designed for operation on pulverized coal. The remaining two are designed for operation on fuel oil; one of the latter is now running in freight service.

One of the large manufacturers active in gas-turbine development is working on a gas producer to provide gas from coal as a gas-turbine fuel; if it proves successful there would be no fly-ash involvement in the gas stream.

And, of course, there is another approach to the fuel problem; namely, burning fuel in a furnace and transferring the heat through heat exchangers to air under pressure and thence to the gas turbine, with the result that no actual flue gas or fly ash enters the turbine.

Standardization of Gas Turbines

It is quite evident from gas-turbine developments in this country to date that considerable standardization will take place and that manufacturers will make machines in a few definite sizes. Such a plan of manufacture should aid progress and reduce costs. It is a conservative plan, and rightly so.

In general, the manufacturers believe that, only by proving the reliability and serviceability of materials now being used for the temperatures involved, and by waiting until sufficient experience has been secured with various sizes and types of units, will they be justified in entering into expensive production. This naturally means that commercial development of gas turbines will be slow, but ultimately sure.

Atomic Power

We are hearing considerable these days as to future possibilities of atomic power. The United States Government is doing extensive research on the subject, but just what the ultimate answer is to be, either in connection with prime movers, medicine, or warfare, I do not believe anyone knows at the moment.

Fuels—Reserves

Discussion has been widespread in recent years as to the alarming outlook for the nation's fuel supply. In the final analysis, coal is the fuel to which United States will have to look over the ages. It is therefore comforting to learn, from the latest reports of the U. S. Geological Survey, dated January 1, 1948, that we have three million million (3,000,000,000,000) tons underground. This figure represents approximately 99 per cent of the original deposits. In other words, only 1 per cent of the original reserve had been consumed as of the above date.

Even allowing for errors and losses in mining, and discounting those reserves which are too thin for commercial mining, there still remains a large national reserve, ample for our requirements for centuries.

Over half the total reserve consists of low-rank coals located in our Western states. Specifically this is sub-bituminous and lignite, and is located in the Dakotas, Montana, Wyoming, Colorado, Utah and Washington. In the Eastern states there is an ample reserve of high-quality steam coal. The metallurgical-quality coals, which are at present in great demand, have a much more limited reserve. Utility buyers of these grades find themselves bidding against the steel industry for the available supply.

Fuels—Future Trends

Wartime experience taught plant operators how to utilize many unfamiliar and inferior grades of coal. It also taught the value of wise and conservative plant design. Looking into the distant future, it is obvious we must plan the use of lower-rank coals in steam-power plants. But for the immediate future, we know there are ample reserves of relatively high-grade steam coals available to span the life of any installation being made at present.

Coal Quality Will Improve

The quality of coal from any of the important producing fields should steadily improve, since marginal wartime coal production is gradually being displaced in the market by production from modern, well-designed, coal-preparation plants. The degree of this displacement and, hence, improvement in coal quality will depend, to a great extent, on general business conditions. Many mines are being depleted and coal producers are replacing the tonnage by production from new mines. This requires a tremendous investment by the coal industry.

New mining methods and the continuous-mining machine have made possible greatly increased production per hour and per man, in the underground phase of operation. Many existing mines cannot obtain full advantage of these improvements without large investments to improve mine haulage, hoisting capacity and preparation-plant capacity.

Coal-production costs can hardly be expected to be reduced materially when we consider the extent of new investment required by the coal industry and the effect of wages paid to employees which, in the coal industry, amount to something over 50 per cent of the total production cost at the mine.

General

We have a number of specific examples of the manner in which the utility industry has coped with, and supplied to the full, the ever-changing needs of the consumer. I refer specifically to Fisk Station of Commonwealth Edison Company as an example. This station was originally designed in 1902 and the first of the large turbogenerator units of that time was installed there. Below is the chronological history of the various expansion steps. Fig. 7 shows these developments in two curves — one in terms of capacity, the other in reduced heat rates accomplished in the various rebuilding steps. The latter curve well represents how fuel requirements per

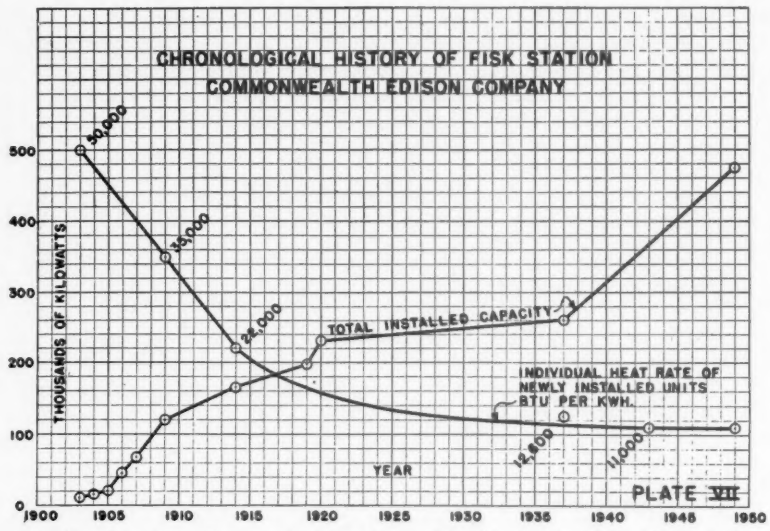


Fig. 7—Graph of Growth in Capacity and Reduction in Heat Rate of the Fisk Station of Commonwealth Edison Co.—1903-1949

kilowatthour have been reduced year by year in the utility industry. The station was first designed for a total of 70,000 kw. When present plans are completed, it will have an installed capacity in excess of 450,000 kw.

Chronological History of Fisk Station—Commonwealth Edison Company

1903—Two vertical turbogenerator units were installed, each with a capacity of 5000 kw, served by 16 Babcock & Wilcox water-tube boilers operating at 180 psi, 513 F, and fired by natural-draft, chain-grate stokers.

1905—At the end of this year, 4 such turbogenerator units and 32 boilers were installed.

1906—A fifth similar unit was added, with a capacity of 8000 kw.

1907—By the end of this year, 10 vertical turbogenerator units had been installed; total capacity 68,000 kw.

1909—A major rebuilding program was now completed. The first four units had been replaced by new units identical to No. 5 and the generators on the remaining six units had been rewound for an increased capacity of 12,000 kw each. The original boilers were retained. Station capacity was now 120,000 kw.

1914-1920—During this period were added: 4 horizontal turbogenerator units ranging in size from 2000 to 35,000 kw, served by 4 cross-drum boilers per turbine operating at 200 psi, 588 F, equipped with economizers and induced-draft fans, and fired by chain-grate stokers. Station capacity was now 230,000 kw.

1937—A 30,000-kw topping unit was installed, served by 2 pulverized-fuel-fired boilers operating at 1200 psi, 900 F. Sixteen old boilers were removed to provide space. Station capacity was now 260,000 kw.

1943—A 147,000-kw, tandem-compound unit with 5 stages of regenerative feedwater heating was added, served by two 750,000-lb-per-hr boilers operating at 1250 psi, 925 F. Vertical units 1, 8, 9 and 10 were removed. Station capacity was now rated at 359,000 kw.

1949—In July, 1949, the installation of a new 150,000-kw, tandem-compound unit is scheduled to be completed, served by boilers identical in size and steam conditions to those installed in 1943. Vertical units 2, 3 and 4, together with sufficient low-pressure boiler capacity, are still to be in stand-by service. Completion of this project will bring the station capacity up to 473,000 kw.

As to the future, it is this writer's belief that, for units in the sizes generally required by the utility industry, the steam cycle will be the primary cycle for some time to come. The writer would further expect an increased number of unit systems to be installed, by which is meant installations consisting of one boiler and one turbine.

This does not mean that there is no place in the utility industry for the gas turbine which, in the writer's opinion, will most certainly find its place there. It should be borne in mind that a gas turbine can be built which would require no cooling water whatsoever; it could be remotely controlled and operated; and it would not require complicated foundations or building structures. With all these advantages, many systems should not only find it possible, but should welcome, the use of gas turbines even in the moderate sizes.

The Future For Gas Turbines

The writer expects that the first evident progress in gas-turbine development will be for railroad service. A simple, open-cycle, gas-turbine locomotive, with a relatively low thermal efficiency of about 20 per cent, can compete very successfully with the best Diesel engine—if it can operate with coal as a fuel.

It is to be expected that the gas turbine will develop into reasonably large units, as time goes on, but it must be remembered that when speaking of a 30,000-kw, gas-turbine generator, the prime mover driving that generator has a capacity of approximately 90,000 to 100,000 kw.

The utility industry of this country can look with pride to the fact that they have been pioneers. They have tried to anticipate consumers' needs and have succeeded to an amazing extent, and they have cooperated in the highest degree with progressive ideas of engineers and manufacturers. It is, therefore, inconceivable that they will in any sense neglect or be backward in taking advantage of this newest development, the gas turbine, even though it is at the moment most definitely in the development stage—although showing progress.

Technical Advance Accelerating

In closing, the writer would like to repeat and emphasize that the technical phases of these various branches which compose the utility industry have been advancing in recent years at an ever-accelerated rate, and that in some phases of the industry we are likely to see even more advances in the immediate future than we have seen in the corresponding number of past years. Advances in all branches of science point to and support that conclusion.

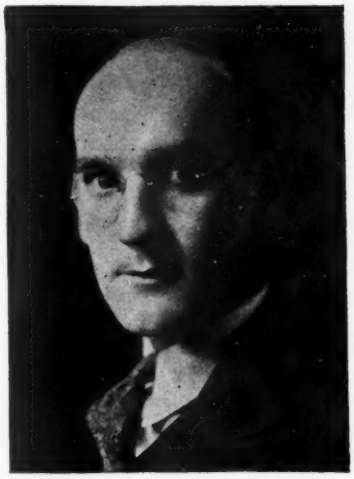
Economic Distribution for Tomorrow's Loads

By T. J. Brosnan
Distribution Engineer, Buffalo Niagara Electric Corporation

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 1, 1949

SINCE the close of the war the attention of our industry has been focused on the construction of additional generating capacity.

It is quite natural that during such a period the expenditures for expanding the capacity of the distribution system have been kept as low as possible. The generating plant has a rather fixed rating and its capacity must be kept above the system load. Fortunately there is considerable flexibility in the rating of the distribution system and it is possible to restrict temporarily the expansion of that system. This makes it possible to level off to some extent the peaks in capital expenditures that would occur if construction programs for all parts of the system had to be coincidental.



MR. BROSNAN

Generation Vs. Distribution

However, it is well to keep in mind the normal relationship that prevails between the investments in generation and distribution. This relationship has existed over many years and there is no evidence of any major change. During the war years we learned how to make better use of all of our plant capacity but it does not seem that this will result in any important change in the relative investments in different portions of the system.

Relative Investments and Expenditures for One Representative System

Fig. 1 shows, for one representative system, the relationship that exists between the investments in generation, load-area distribution and the other parts of the system. Generation accounts for about one-third of the total investment and load area distribution is responsible for almost one-half of the total investment. The remainder of the investment is devoted to bulk power transmission and general items such as offices and shops.

Load-area distribution as used in this presentation includes what is generally called subtransmission as well as the distribution substations and the distribution circuits and equipment. It excludes the high-voltage transmission and the terminal stations which connect the high-voltage transmission to the subtransmission system. These, together with the generating stations, are classified as the bulk power system.

Increase of Generation

Fig. 2 shows, for one representative system, the plant items that are included in load-area distribution and the relative magnitude of the investment in each of these items.

Fig. 3 shows, for one typical company, the relationship that has existed, during the past ten years, between the expenditures that have been made for the expansion of generation, transmission and load-area distribution. In reviewing this chart, proper consideration must be

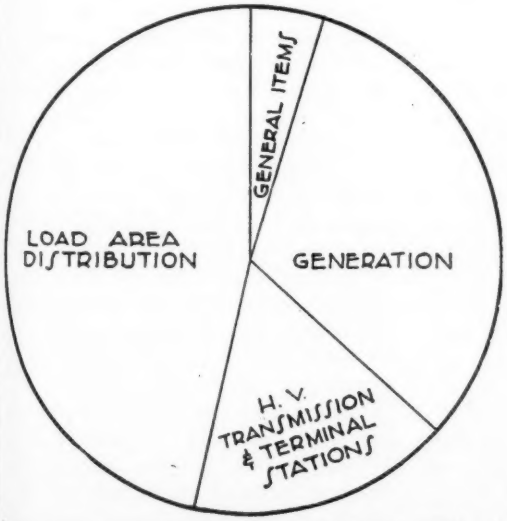


Fig. 1—Chart Showing General Relationship of Investment in Generation, Load-Area Distribution, Etc., For One Typical System

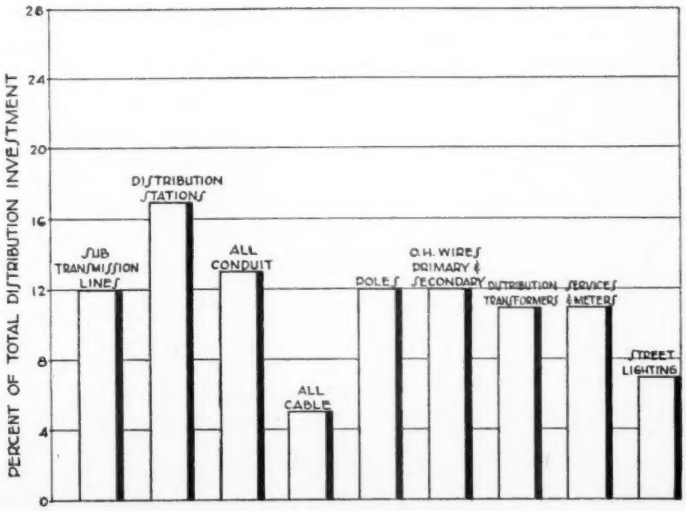


Fig. 2—Chart of Plant Items Showing Amount Invested for Load-Area Distribution in Representative System

given to the lower purchasing power of our currency at the present time. The curves reflect the curtailed construction during the war years due to the shortage of materials. However, the main purpose of the chart is to illustrate the present emphasis on the increase of generation. Data in the annual statistical issues of the *Electrical World* show a generally similar situation for the entire industry.

The load growth that has occasioned the present rapid expansion in generating capacity seems to be predominantly in the residential and commercial classifications. Such load increases require expansion of all of the items in the load-area distribution system. It is, therefore, most probable that for every dollar invested in new generation there should be about $1.50 invested in the expansion of the load-area distribution systems. With the immediate need for generating capacity, the investment in distribution system expansion necessarily lags but the normal balance in the investment between the two should be re-established over a short period of time.

Attention Given to System Design

When a company decides to install a new generating unit involving an estimated expenditure of let us say $12,000,000, the management of that company takes an active interest in each step of the design and construction of the unit. Capable engineering talent within the company is assigned to the project and this is often reinforced with consulting service. Careful study is given to such questions as to where the unit should be located, what its size should be, what is the proper balance between initial investment and estimated operating costs and other items such as the provisions for safe and economical operation of the unit.

How many of us give the same attention to the design of the load-area distribution systems that will be installed to deliver the output of the new generating unit to the ultimate customer? Do we appreciate that something in the order of $18,000,000 will be spent in the load areas in order to distribute the output of this $12,000,000-generating unit? That $18,000,000-investment will be made in small increments over a longer period of time. Probably 50 per cent will go into poles, conductors, distribution transformers, services, meters and street lighting. In one typical company about 85 per cent of the work

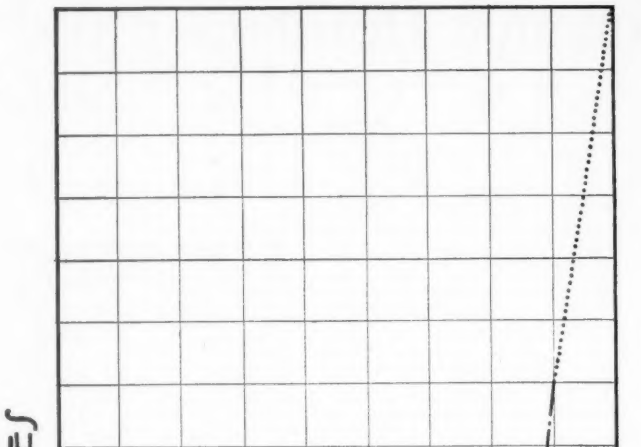


Fig. 3—Curves Showing Relationship of Annual Expenditures for Expansion of Generation, Transmission and Load-Area Distribution for a Typical Company (Figures for 1949 are Anticipated Expenditures)

on these portions of the system is done on individual projects costing less than $1,000 each, and 95 per cent on projects costing less than $5,000 each. In other words, in that $18,000,000 expansion of load-area distribution, there will be something in the order of $7,000,000 to $8,000,000 invested through individual projects amounting to less than $1,000 each.

Obviously, the management of a company cannot review each of these small projects to make sure that the proposed investment will become a part of a dependable, flexible and economical distribution system. However, they can make sure that the men who design these minor extensions are provided with a sound basic plan for system expansion and that they understand how the small individual projects are expected to fit into that general plan. They can also make sure that those men are provided with adequate guides for the proper design of those individual projects.

Need for Basic Plans

In my opinion, there should be a basic plan for the development of the distribution system in each load area supplied by a company. The basic plan should recognize the probable trend of load growth and establish the fundamental development of the system to provide for this growth. The pattern should be flexible to accommodate unexpected changes in the trends and should provide for system expansion in rather small increments so as to avoid excessive investment far in advance of load requirements. It should guard at all stages of development the maintenance of proper balance between investment and operating charges. It should establish for each

load area the quality of service for which the system should be designed in terms of limits of voltage drop and provisions for continuity of service.

Perhaps these ideas might be clarified somewhat by a brief consideration of the basic development plan for one load area. The one that I have selected is the urban area of Buffalo, New York, which is an industrial city with a population of about 600,000 people. A new 60-cycle system was built in that load area in 1930 to replace the 25-cycle, general distribution system. The basic plan for the new system provided radial subtransmission circuits directly from the generating station to small, multi-unit automatic substations located throughout the area. The general spacing of the substations was worked out to establish the minimum annual costs taking into consideration both investment and operating expenses.

As load grew within the area a new supply was justified and was introduced at the other end of the area by the construction of a terminal station supplied by the high-voltage transmission system. The original subtransmission circuits that radiated from the generating station were sectionalized and portions transferred to the new terminal station. With further growth of load it is anticipated that another terminal station will be introduced between the generating station and the existing terminal station and the subtransmission system will again be subdivided.

The basic plan for the area guides system changes such as those just described. It also establishes the routing of the subtransmission circuits and the location and size of the substations. It sets out the sections of the area where underground distribution should be developed. It also determines the general arrangement of distribution feeders including the sectionalizing and emergency tie facilities. In brief it is the basic pattern for the development of the load-area distribution system.

The example that I have given is for an urban area. It is often more important to have basic plans for the rural load areas where the load density is less.

Guides for Detailed Design

The second item referred to previously is the importance of a proper guide for detailed design and methods of construction. Most companies have such guides in the form of standard books. What I wish to emphasize is the importance that management should place on having these standards carefully prepared, properly kept up to date and thoroughly understood by the men who must use them. These books will govern the design for the largest investments that will be made in a system. They should provide all the data required to insure economic, safe and dependable design and construction. Such standard books seem to provide the most satisfactory results in those cases where engineering and operating departments have cooperated in their preparation and where company management has taken an active interest in the adequacy of the manuals and the educational work required for their proper application.

Importance of Basic Plans and Design Guides

It would be interesting to show how the basic plans and the guides for detailed design should coordinate to direct the proper development of the distribution system. It is of course impracticable to do so in this short discussion. However, I am going to use the one item of system losses as an illustration.

When a new generating unit is being designed, careful study is given to what increased investment can be justified to improve the efficiency of the unit. The management of the company is informed about the cost and advantages of higher temperatures, higher pressures, reheat, etc. These are studied on the basis of such factors as the anticipated loading of the unit and the probable cost of fuel and a pattern is made for the balanced design of the unit. It is much more difficult, but at least equally important, to achieve an efficient design for the distribution system which will be constructed in small increments over a period of years.

I have had the opportunity to review measurements made about twenty years ago on a number of older type distribution systems supplying residential and rural areas. They show kilowatthour losses in excess of 20 per cent within the load area. In those systems, 20 per cent of the energy delivered to the load area never reached the ultimate customer. The losses at peak load for those same systems were considerably higher and probably exceeded 25 per cent.

If the output of the new $12,000,000 generating unit, which is being used in this paper as a typical example, was to be delivered to the load through one of those older systems, then $3,000,000 of the investment in that unit would be used to supply losses in the distribution system. Twenty per cent of the fuel supplied to the boiler in the annual operation of the generating unit would be similarly used.

The past twenty years have witnessed great improvements in the design efficiency of distribution. It is safe to say that the losses in a modern load-area distribution system are at least 25 per cent below the figures mentioned above. However, the losses in this portion of the system are still an item of major importance. I wonder how many know how close present distribution design comes to a proper economic balance?

When we think of methods of reducing distribution losses without excessive increase in investment, our first inclination is to consider the basic plan for system expansion. It is obvious that much can be accomplished by bringing the subtransmission circuits close to the load by the use of small automatic substations carefully located throughout the load area. Other companies have achieved the desired results by the use of higher distribution voltages. Such major design factors are of prime importance. However, we should stress with equal diligence the need for economic balance in the design of the small projects through which the distribution capacity is increased.

The excessive losses of each poorly designed secondary require extra capacity in a distribution transformer, a distribution feeder, a substation, a subtransmission circuit as well as in the "bulk power" system. Not only must the generating plant provide the energy lost in that secondary, but also the added losses incurred in the delivery of those losses through the system.

Performance Data For Distribution Feeders

Some performance data for distribution feeders was called to my attention recently. As an illustration, the load supplied by one of those feeders had increased rather rapidly but was still within the safe capacity of the original conductors. The delivery voltage to the customers had been maintained within reasonably satisfactory limits by the addition of supplementary regulating equipment. However, the losses could have been reduced by about 30 kw and by about 45,000 kwhr per year at the substation by installing larger conductors on a portion of the circuit. The cost of larger conductors would have been about $5,000, and these larger con-

(*Continued on page* 249)

Rate Trends and Problems

By S. W. Andrews
Rate Engineer, American Gas & Electric Service Corporation

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 1, 1949

IN 1947, rate increases were granted to 13 electric public utilities. This marked the end of the long period of electric utility rate reductions which started in the middle 1920's.

In 1948, there were 77 rate increase applications which were granted. In the first four months of 1949, there were 31 rate increase applications granted. This makes a total of 121 rate applications granted since the beginning of 1947. There are 22 cases which are still pending. There was one case in 1948 which was denied. There was one instance in 1948 and another in 1949 where companies withdrew their applications before their cases were heard.

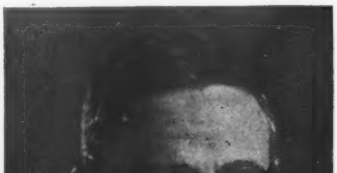
The total number of applications, for which I have just given you figures, amounts to 146. There were 115 companies involved. There have been a few cases where companies during this period applied for more than one rate increase, but the difference between the number of applications and the number of companies involved is due mostly to the fact that some companies operate in more than one state and applications are counted in different states separately.

These 115 companies represent 43 per cent of the meters served by our industry. This does not mean that 43 per cent of the electric customers served have received increases, because many of the increases have affected only a part of the customers served by the 115 companies.

The total money involved in these increases during this period amounts to about $78,000,000 granted, and about $22,000,000 where the cases are still pending, a total of approximately $100,000,000. This is a large sum. Yet in a way it is modest, because it compares with about $80,000,000 of reductions made in the single year 1946.

Rate Increases for Public Power

The municipalities and other governmental agencies supplying electricity to the public have also felt the need for increased revenue. Over 250 increases were made effective in this field since 1947, even though many had increased rates during 1944 to 1946, the period of greatest rate reduction in the history of the private companies. We do not have figures as to the amount of these increases.



MR. ANDREWS

The increases which have been granted, and which have been applied for by the private utility industry, cover all sorts and kinds of adjustments. Among them are the following: fuel clauses, increases in minimum charge, elimination or reduction of prompt payment discounts, surcharges, and, of course, change in base rate charge, together with various combinations of these different types of adjustments.

Fuel-Clause Adjustments

The earlier increases, that is, those made in 1947 and the first part of 1948, were very often fuel-clause adjustments. This was the period when fuel prices, particularly that of coal, were advancing rapidly. Many companies throughout the industry already had in effect fuel clauses applicable to their industrial rate schedules, but some did not. As the cost of fuel went up and had a major effect on the cost of operations, fuel clauses were extended to industrial schedules which did not have them. They were extended in a somewhat lesser degree to commercial rate schedules and in some cases to residential schedules.

The 1949 EEI Rate Book shows that 162 companies out of the 200 listed in the book have fuel clauses. There are approximately 500 industrial power schedules with fuel clauses; there are about 150 commercial schedules with fuel clauses; there are only 29 residential schedules with fuel clauses.

The fact that fuel clauses were not extended more widely to the smaller customers is due in considerable measure to the attitude of regulatory commissions. Most commissions have for many years considered that fuel clauses were appropriate to industrial schedules where the unit cost of fuel is a large proportion of the average sales price of energy.

On the other hand, while some regulatory commissions have thought that fuel adjustment clauses were appropriate on all sales, other commissions have felt they were not particularly appropriate on sales to small customers, such as residential, where the average rate is considerably higher than in industrial schedules, and where the cost of fuel per kilowatthour is a relatively small proportion of the average sales price.

Base Rate Changes

There were a number of cases where companies proposed fuel charges on rates applicable to small customers, only to find that the commissions preferred a change in the base rate instead of the addition of a fuel charge. The one rate application which was denied was a case of this sort. The company proposed a fuel adjustment on small customers, including residential customers. The commission denied the application. In doing so, however, it told the company that if it needed an increase it should come back with an application to increase the base rate.

Where fuel clauses have been added to residential rate schedules, it is frequently the case that the clause does not apply to all of the customer's consumption of energy—the first 100 kwhr, or the first 200, or some other number of kilowatthours, being exempted. The result is that, even where companies do have fuel

clauses in residential rates, many of the small users are not affected at all.

Beginning in the latter part of 1948 and continuing to the present, the changes in rates have been, more and more, increases in base rates rather than the addition of fuel or other types of escalator clauses. There have been in general two kinds of changes. Some companies, after an examination of individual rate schedules, have found that certain schedules, which had perhaps been in effect since before the war, were no longer appropriate to present-day operating costs and investments. They have then adjusted these rates and left their other rates alone.

Examples of this are increases in industrial rates where companies found that rates which met competitive conditions of several years ago with proper margins were no longer appropriate under present-day economy. There have been cases where industrial rates of a company have been changed without corresponding changes in rates for other classes of service.

Other examples have included increases in low follow-on rates for all classes of service, including residential, where companies have found that there was no longer a proper margin between the low follow-on rates and costs of production. Changes in follow-on rates have in some cases been made without corresponding changes in the initial charges in the rate schedule.

Increases In Demand Charges

Still other examples include increases in demand charges where companies have found that existing demand charges were no longer appropriate to present-day investment costs in utility property. Such changes have in some instances been made without corresponding changes in energy charges, perhaps because new high-cost generating capacity will have high efficiency and low operating costs.

There has been, throughout the industry, much analysis of rate schedules and much searching out of weak spots and much correction, to bring rate schedules in line with present-day conditions and to make certain that increased sales to all customers in all classifications will contribute to operating income as well as to gross revenues. Such analysis and such correction of individual rate schedules are at all times among the main jobs of the rate men in the industry, but they are of particular importance at times when economic conditions are changing as rapidly as they are at present. I am sure that the rate men recognize this, that they will continue this sort of analysis, and that they will recommend this sort of correction where correction may be necessary.

Across-the-Board Rate Increases

Contrasted with selective increases in certain rate schedules or parts of schedules is the second kind of change in base rates. There have been examples of across-the-board increases which have affected all customers in all classes to substantially the same degree. Across-the-board increases have been made where companies have found their over-all earnings to be inadequate and where general increases have been necessary to put earnings on a secure basis.

I have described some of these types and kinds of rate changes in some detail to show their variety. Rate problems and their solutions continue to be problems of individual companies that vary from company to company. Some companies are more affected by changes in fuel costs than others, depending on their location, their proximity to sources of fuel, the kind of fuel which they use, and whether or not they have hydroelectric generation.

Construction programs vary from company to company, which in turn affect needs for earnings and rates. And the rate problems of all companies are affected tremendously by what was done to their rates in the first year or two after the war. The year 1946 saw larger rate reductions than any year in the industry's history. Some companies which have sought increases in the past few months have said frankly that they found it necessary to restore cuts in rates which were made a year or two before.

Just as problems vary from company to company, so do procedures in seeking rate increases vary from jurisdiction to jurisdiction. In some jurisdictions, the laws and the commissions' rules require that rates be considered on the basis of return on net investment—just bare original cost of plant less depreciation reserve with some allowance for working capital, which is often reduced to a bare minimum. In other jurisdictions, the law specifies that the commission shall give weight to both original cost and present-day value.

There is some variation in rates of return which commissions have allowed during the last two years. This is due, to some extent, to the different methods of determining rate base. The more weight that a commission gives to present-day value in determining the rate base, the lower is the rate of return which has been granted. Conversely, the closer the rate base approaches the original cost concept, which results in a lower rate base figure than the fair value concept, the higher is the rate of return which is granted.

Likewise, there is variation in other matters which traditionally have been considered to have an effect on rates, such as the whole problem of depreciation, including methods of calculating rates at which depreciation reserves are to be accumulated, methods of relating book depreciation reserves to actual depreciation of physical property, etc. In some jurisdictions there has been a trend towards determination of rates emphasizing the concept of cost of service, with costs assigned to each class of service, if not to each rate schedule.

Determination of rates almost solely on the basis of costs is difficult enough at a time when operating costs and investment costs, with their attendant fixed charges, are relatively stable. It is many times more difficult to do this when costs are varying and the relationship between investment, fixed charges, and operating costs is likewise varying; and when the sales of service to different classifications are likewise changing one with respect to another. In many more jurisdictions, however, weight is given also to the other factors which enter into rate-making, such as value of service, competition, sales promotion, and public and customer relations.

Only One Denial

And yet, in spite of the variety of problems, the variety of procedures and the variety of solutions, the facts stand out clearly that, when the time came that rate increases were needed, they were secured almost 100 per cent. Our records show only one denial, and our records also show that the majority of increases granted were for the full amount requested. The increases, for the most part, were granted promptly. Of all the applications which were filed up to the end of 1948, about 100 in all, only 4 are still pending.

Perhaps the modest amount of increases requested has something to do with the good record of increases granted. However, regardless of this, it seems to me from my talks with many of the rate men in the industry that over and over again the companies, by one method or another, have told a very practical

story that goes right to the fundamentals of our industry.

The industry is engaged in an expansion program for the purpose of rendering the type and kind of electric service which the public expects and demands. As an industry, we found that we came out of the war without proper margins in facilities to provide thoroughly good service because during the war, with material shortages, we could not provide all the facilities which thoroughly good service demanded. Since the war not only have costs of operation gone up—all the material which we buy, as well as labor rates which we pay—but the tremendous increases in demands for service have required the provision of additional facilities and are continuing to do so.

These are fundamental facts of our industry and I think there is no question but that they have been recognized by all the commissions and given full weight by them in their considerations of our problems.

Financing Problems

Another fundamental fact is that when the industry is in the midst of an expansion it is never able to finance entirely from its own resources. Now that we are in the midst of an extremely large expansion program, the financing program is much larger and more pressing than it has been for many years. The industry as a whole, and practically every company in it, must go to the investing public and sell securities of one form or another to finance the necessary construction program. The companies must be able to sell securities or they cannot carry out the construction and, if they do not do this, service to the public will not be thoroughly good. I believe that all the commissions recognize the problems of financing, and that they give full weight to this factor in their deliberations on rate matters.

Under present circumstances, the need for earnings in order to provide a fair return is a very real practical matter which is tested in the market every day. If investors will not buy new securities on the basis of satisfactory price and return, it is crystal clear that the company's earnings are less than fair and the commissions, I am sure, give full weight to this in their deliberations on rate matters.

There have been cases recently in which companies have gone to the commissions and have said something like this: "Your rules require that we show you what an original cost rate base amounts to—here it is. Your rules also require that we show you something about present-day values—here are present-day values. Your rules provide for different treatments of the subject of depreciation—here are the different treatments of that. In order for us to carry on and finance our construction program, which is necessary to give thoroughly good service to the people in our communities, we need so many dollars of operating income; we now have only so many dollars; therefore, we need an increase of so many dollars."

Under present conditions for any particular company there cannot be wide differences of opinion as to necessary earnings. Perhaps we have found a pragmatic solution, for the time being at least, of what constitutes a fair and adequate rate of return. I think it is mainly on the basis of this story—what is necessary to give a fair and adequate return attractive to investors, and the increases in operating costs—that the rate increases, which have been applied for in the last two years or so, have been granted.

Where do we stand today? Do we have rate problems? If so, what are they?

In 1948, Class A and B electric utilities had gross operating revenues of $4,156,000,000 and operating income of $790,000,000. At the end of the year, they had electric plant account of $15,550,000,000. If, as seems likely, the plant account should be increased to $20,000,000,000 in the next three years, operating income would have to be increased to about $1,015,000,000 if it is to bear the same relationship to plant account that it did in 1948.

Factors Determining Operating Income

There are three major factors which determine operating income. One is operating expense, including depreciation accruals and taxes. The second is sales. The third is the price which is charged, or the rates.

There is considerable evidence that many of the materials utility companies buy, which are used in the operations of the companies and so are accounted for in operating expense, have reached their peak prices and have perhaps started to decline. There are new generating units coming on the line which will have higher efficiencies than older units. Utilities and their managements are constantly studying and developing ways of achieving more economical methods of operation.

These things, which tend to reduce operating expense, work in the direction of lower rates, just as they did in years gone by when the industry made its outstanding record of rate reductions year after year.

If sales programs can be carried out—and I think we are definitely at a point where we must sell as never before—which will bring about a better balance in sales as between the different classes of customers and which will bring about better load factors on our facilities, provided always that the individual rate schedules are appropriate, such sales programs will work in the direction of lower rates.

Higher Fixed Charges

On the other hand, the addition of new facilities at present, and probable future high prices, quite definitely works in the direction of higher rates because of higher fixed charges—depreciation, local taxes, necessary return. While much of the new construction is for the purpose of serving anticipated increase in loads, some of it is for the purpose of restoring proper margins of reserve in generating stations and in transmission and distribution systems. To the extent that new facilities are for the purpose of restoring margins of reserve and are not accompanied by new revenues and additional income, they, of course, work very definitely in the direction of increased rates regardless of how costly they may be.

Whether the forces working towards lower rates will outweigh the forces working towards higher rates, or whether the reverse will hold true, or whether the two will balance each other, only time will tell. I do not mean that we should sit by and just wait to see what happens. The methods of more economical operation must be developed to the utmost. Likewise, the well-balanced sales programs must be carried out as effectively as possible.

By taking these actions, the industry can increase the forces which work towards lower rates so that they will weigh heavier in the balance. However, since the rate problem is a company problem and not an industry problem, it is certain that the weights of the forces will be different in different companies and, hence, that the rate programs of different companies will be different. I would be surprised indeed if the forces working for higher rates did not prevail

in many instances, requiring more upward adjustments.

The major factor which works for higher rates, that is the addition of substantial new facilities at high prices, has a delayed effect. The full effect of this factor will not be felt until the new facilities are completed and placed in service. While commissions have generally given some consideration to uncompleted construction programs and to estimates of operating revenues and expenses for future periods, I doubt that there is a case where an increase has been granted on these factors alone. The commissions, I am certain, must always deal in major degree with facts already established—the amount of investment which has been made up to the date the application is filed, and operating revenues and operating incomes which have already been realized over a period which has been completed.

I think perhaps it is fortunate that the effect of new facilities in working towards higher rates is delayed. If the new facilities had had immediate effect on rates, as did increases in operating costs, rate increases would certainly have been much more substantial than they actually were. If we are to the point, as I believe we are, where operating costs can be lessened and where balanced sales promotion programs can be made effective, I am sure that rate increases can be kept to a minimum.

Pubiic and Customer Relations

During the past year or two, many of the rate proceedings have been accompanied by thoroughgoing public relations and customer relations activities. Many companies have found it wise not only to make a convincing case before the commission which has jurisdiction, but, what is of equal importance, also to make a convincing case before the public which they serve.

There have been numerous instances where, even in advance of the formal filing of an application with the commission, a company has gone to municipal officials, to newspapers, to trade associations, to chambers of commerce, as well as to many of the individual customers, and told its story. The record in some cases has been truly amazing, where out of thousands of customers involved protests have been non-existent or limited to just a handful.

The companies, which have already increased their rates, have unquestionably been aided in securing public acceptance of their actions by the fact that other prices were going up at the same time. As other prices start to decline, it is going to be more difficult, but just as important, to secure public understanding and acceptance of rate increases which are still to come.

As time goes on and further rate increases may be necessary, I am sure that it becomes increasingly important that we be able to satisfy both the commissions and the public that everything has been done to achieve economy and efficiency in the conduct of our business and that rate increases which may be requested are a last resort.

The problem of the rate men as I see it, company by company, is to watch closely the interplay of the factors working towards higher rates and those working towards lower rates and be prepared to act when and if circumstances require. The rate man's problem is also to check and recheck his individual rate schedules and see that they continue to be appropriate to our ever-changing conditions. In doing this he wants to be sure, of course, that each schedule is sufficient to cover costs, but he also wants to be sure that each schedule is best suited to promote the sale of additional service.

Much of the service which we sell is competitive. Industrial service, where we compete with a customer's private generating plant; residential and commercial service, where every kilowatt-hour which goes into a heating or cooling application, competes with some other form of energy. Rates, to be appropriate, must recognize the competitive situations more than ever. We must be very careful to see that we do not unwittingly price ourselves out of any of our markets. Rates can be an important tool in sales promotion programs. They should be designed so as to be as helpful as possible in our building up of the loads which we serve.

Our major problems, if I interpret them correctly, are, first, to provide the public with thoroughly good service and, second, to secure adequate earnings or operating income so that the service can be provided.

I am sure that all of us will agree that we want to secure adequate earnings to the greatest possible extent through the medium of increased sales and decreased operating expenses, and to the smallest possible extent through the medium of increased rates.

Economic Distribution for Tomorrow's Loads

(*Continued from page* 245)

ductors would have avoided some of the remedial measures for voltage control. This one loss item of 30 kw sounds insignificant but, when multiplied by the number of such cases that can develop with the growth of load in a large system, the total can be very important.

I have spoken in some detail about losses simply as an illustration. There are many equally important items in distribution design such as the supply of reactive current, methods of maintaining proper voltage, facilities for sectionalizing and interconnecting and the numerous structural and mechanical problems. Much has been done on all of these during recent years but such items require continuous attention in a growing system.

Management Guidance

It is being predicted that the load supplied through our distribution systems will double in a relatively short time. Some say this will happen in ten years, some say fifteen years, and the more conservative predict twenty years. While the systems are being expanded to accommodate this load growth, an appreciable part of the present plant will have to be replaced due to deterioration or obsolescence. If our present distribution systems are not entirely satisfactory, we have a wonderful opportunity in the years just ahead to convert them to economic and dependable systems.

While the load is doubling we will invest at least as much in load-area distribution as we will in all the rest of the system. It seems apparent therefore that the design for the expansion of the distribution system should be given careful guidance by management. Adequate qualified personnel should be assigned to this design and they should be given ample opportunity for the interchange of ideas with others in the same field. The most satisfactory methods for accomplishing such interchange of ideas are through active participation by those men in the meetings of the Engineering Committees of the Edison Electric Institute and other technical organizations and through discussions with the manufacturers of all kinds of electrical equipment.

Residential Rates for Tomorrow's Loads

By L. R. Lefferson

Manager, Rate Department, Ebasco Services Inc.

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 1, 1949

PUBLIC utility rate structures should be such that a customer can ask for, and be permitted to take, any kind of standard service he wants, provided his operations do not interfere with the good service to others and, provided further, that he pays any extraordinary costs of supplying the service.

This is a basic philosophy applying to all classes of service but, if there were a choice, it should apply first to residential service. It is because of the residential customer primarily, that we are granted franchises to occupy the streets with our service facilities. No other class is so wholly dependent upon our service.

The American people want electrical living and the only practical way for the residence and other small-use customer to get it is through central station service. The larger customers might get it through isolated plants but to the residence there is no practical substitute. While the residential customer is dependent upon the public utility, so also is the financial stability of the public utility dependent to a major extent upon the residence classification.

Importance of Residential Market

The residential group represents 82.4 per cent of our customers, 21.2 per cent of total kwhr sales, and 35.5 per cent of total revenue. It is important not only by virtue of its large representation in our total business. Its stability throughout good times and bad gives it added significance. There has been scarcely a year in the industry's recent history that this classification has not shown an increase over the previous year in customers served, kwhr sold, and revenue received.

Moreover, in only one year, namely, 1933, does the record show an average kwhr consumption per customer lower than the previous year and that was by only 1 kwhr. Over the past 20 years, the yearly consumption per customer has shown an average gain of 53 kwhr, with

MR. LEFFERSON

the largest gains in the past 5 years. In each of the 3 years since the war the gain per customer has been 100 kwhr, or more, with 1948 topping all previous gains with an average of 125 kwhr.

New Electrical Home Devices

Since the last war, manufacturers have produced and promoted on a national scale new devices and uses for electric service in the home which have aroused rate people to review the adequacy of present residential rate designs. *Electrical Merchandising's* tabulation of appliances sold in 1941 lists 32 items, exclusive of lamp bulbs and tubes and certain non-electrical devices. The 1948 tabulation contains 44 such items, or a gain since the war of 12 now in use, which either did not exist at all or their sale was so small as to be ignored in the tabulation. Among the more important of these items are air conditioners, dishwashers, disposers, clothes dryers, television receivers and space heaters.

Some of these new loads, high in individual demand or large in aggregate load, threaten to add substantially to system peaks but operate at extremely low load factors. With construction costs 60 to 100 per cent higher than they were, and with potential increases in capacity of 50 per cent or more, there is ample justification for concern over the level of rates.

Perhaps more than any other thing causing this concern is the concerted effort of certain manufacturers to promote on a nationwide scale the use of electric radiant panels for space heating in the home. Electric heat has a real appeal to some prospective home owners. Manufacturers producing and promoting electric space heating equipment have grown in number from 52 in 1941 to 91 in 1947, indicating to some extent the thinking outside the electric utility industry as to the potentials of electric space heating.

Present rates are designed to fit anticipated residential loads falling within a fairly narrow pattern of loads and load factors. When a significant number of residential customers begin to require capacities substantially beyond that pattern, it is time to take stock of the situation. There is today a strong indication that that time has arrived and that even now we may be at the crossroads in basic residential rate design. Within the past year, a subcommittee of the Rate Research Committee has been appointed to appraise residential rates in general and, in particular, to study the possible need for some form of demand charge applicable to loads of unusual capacity.

Measured Demand Charges

Today, approximately 40 companies have in their residential rates a demand element predicated upon measured demands. This charge applies to demands in excess of some predetermined amount varying between companies from about 3 up to 15 kw. It is expressed either of two ways, namely, a fixed charge per kw or a *pro-rata* increase per kw in the number of kwhr in one or more blocks of the rate.

Because there existed some question as to the practicability of using measured demands in residential rates, the subcommittee decided as one of its first steps to conduct a survey among those

companies reporting such rates. The response was excellent with practically all companies cooperating. Almost without exception the replies showed that the demand feature is being strictly applied, at least to the limits possible with available demand meters. Some companies admitted that a few customers may have escaped the demand provision owing to demand meter shortage, but added that this condition is now being corrected.

As to when a demand meter is used, most companies answered that the cue is taken from monthly kwhr readings. When the consumption for several months exceeds some predetermined number, varying among companies but ranging from about 500 to 1500 kwhr, a demand meter is installed. If the registered demand exceeds the free amount, billings therefor start forthwith. If, on the other hand, the relatively high consumption results from high load factor use and the free demand is not exceeded during a reasonable test period, the demand meter is removed.

Bill Distribution Data

In a few cases where the information was readily available, companies supplied bill distribution data covering both actual measured demands and consumptions. The sample is too small to be representative of the industry as a whole, but it is indicative of what might be expected. Individual demands were found as high as 98 kw and many exceeded 10 kw. Load factors range from as low as 3 per cent up to 39 per cent. For one company having 158 customers with demands from 8 to 98 kw, the over-all average annual load factor was found to approximate 20 per cent. Certainly such customers with these high demands and low load factors should not be served under simple block rates designed for the average residential customer.

This company is collecting currently from these 158 customers slightly more than $9,000 annually from the demand provision alone—an average of almost $60.00 per customer. This should answer the question of whether or not a company can afford to install demand meters on residential customers of unusual magnitude.

Up to the present time the demand provision in no case applies to as many as one per cent of the total number of customers served. This, one might say, is an insignificant percentage and too small to bother with. The answer is that rates to be sound must be designed for the future. Rate structures have value only as they develop and protect earnings.

There is only one way to assure a continuing sound rate structure. That is through frequent review and analysis of results in the light of our best estimates of what is to come. Changing conditions must be foreseen as accurately and as far in advance as practicable, and then should be translated promptly into the rate structure to meet those conditions when they arrive. It is far better to anticipate changing loads by the promulgation of adequate rates prior to the time customers are affected than to raise them later.

Demand Provision for Farms

This question of a demand provision of some kind in residential rates is even more important in serving the farm home than the urban home. Oftentimes, service on the farm starts out with residential characteristics but gradually grows into a commercial enterprise. When this change is discovered, our rate application clauses tell us this customer should be reclassified as commercial. The result is usually a substantial increase in bill. How much better it would be if the residential rate anticipated such a change by the inclusion of a charge for demands of unusual size. Under such circumstances the bill would increase gradually along with growth in the enterprise, and this is something the customer can understand.

Some people may criticize the suggestion of a demand element in residential rates on the grounds that it is a departure from the simple forms for which we have all been striving for so many years. Simplicity of rate form is an undeniably desirable objective but not to the extent of jeopardizing the financial integrity of the enterprise. Then, too, it should not be overlooked that adoption of the demand principle as presently applied still leaves the vast majority of customers on a simple block-rate form. Certainly it is not an insurmountable task to sell the equity of the demand principle to the remaining few.

Let us take a look for the moment at present rate forms for classes of service other than residential, and how they came into being. Almost without exception they contain a demand element. That was not true back over our history. Present-day rates are the result of a gradual evolution. From the original flat rate this evolution proceeded through the straight-line energy rate, the step rate, the block rate, and then down to today's almost universal use of the rate or rates embodying a demand element.

To Meet Changing Conditions

These changes did not just happen. They were planned that way to meet changing conditions and because customers as a whole, and companies, both were benefited. Without such changes to meet changing conditions, the electric utility industry could not have maintained over the years its basic philosophy of supplying all types of customers with any kind of standard service needed or desired. The demand provisions helped to keep the charges for service in reasonable proximity to both cost of supply and value of the service.

There was a time when it was widely claimed that demand charges were unpopular and could not be sold even to large power customers. That claim has been proved to be erroneous. Today demand charges are gradually creeping into rates for customers down to, and including, the small commercial. This could not have occurred without the principle being sound and the over-all effect being the accomplishment of the greatest good to the greatest number.

Commercial rates with demand charges applying to loads as low as 5 kw are fairly common today. Under such circumstances, it is scarcely consistent to serve residential customers with possibly several times that much load under rates having no demand element in any form.

Diversity of Load

Many of the new residential devices and uses undoubtedly have a high diversity but this is probably not true of all. Unfortunately these devices are so new, and the installations are so scattered, that dependable information is not yet available. For space heating it seems obvious that the diversity within the class is practically nil. Its maximum use is naturally at times of coldest weather which occurs simultaneously throughout the service area of an individual system.

Electric space heating, except in a few sections, is only in the beginning state and consequently has not as yet

provoked widespread rate consideration. In the Pacific Northwest, it has grown with increasing popularity for several years. Existing rates in many cases were of the straight block type and exceptionally low in general level. They did not contemplate the high demands and low load factors inherent with space heating. Consequently, a serious rate problem has developed and especially for those companies under state commission regulation.

Municipal Distribution Systems

Where there is no state regulation—as for example, with the municipal distribution systems of Seattle, Washington, and Eugene, Oregon—the charge applicable principally to the space-heating portion of total consumption has been substantially increased—in Seattle, from 0.9 to 1.8 cents per kwhr, and in Eugene, from 1.0 to 1.6 cents.

A few Northwest companies had the foresight some years ago to incorporate in their rates a demand charge applicable to extraordinary loads, some applying only to homes equipped for electric space heating and some to any extraordinary demands by whatever caused. Even with these provisions, there is a grave doubt that the rates are compensatory.

One outstanding rate authority from that section recently described the situation as follows:

"All of us in this area believe that residence service rate forms in general use in the Pacific Northwest, both by the larger private enterprise utilities and public agencies, are not properly designed for application to the requirements of space-heating loads. The tail-end rates are too low and the demand charges, where they are used, are too low and start too late, generally on all demands in excess of 10 kw."

No Single Formula

There is no single formula by which this problem of adequate rates for residential loads of unusual size can be solved for all companies. Actually the problem itself differs as between companies and as between various sections of the country. It is a particularized problem for each individual company and situation. I can only urge that it is an important problem for a future that may be nearer than we think.

What is a serious rate problem today for the Northwest could well be an acute problem for others tomorrow. Now is not too soon for all companies to be giving serious thought to what may be best for their individual situations, and putting their conclusions into action. It is easy to put off until tomorrow what should be done today but, in our business, it is often very difficult to do that job when tomorrow comes though it could have been easy to do today.

While I have stressed space heating as one of the new uses requiring possible redesign of residence rates to meet future conditions, it is by no means the only new use requiring attention. I have used space heating merely as an example. We need to know more than we do about the load characteristics of all new household devices, individually and composite. After all, it is the composite load of various combinations of devices and uses that affects our investments and costs. The better our knowledge of these characteristics, the better will be our rate designs to fit the conditions demanded by the public as well as the economics of our business.

Whenever a new device or a new use for our service comes into being, there is a tendency among some of us to single out that device or use for individual rate treatment. Too often such treatment results in rate complication, confusion and claims of undue or unfair discrimination. Being public utilities with an obligation to supply all comers, we cannot pick and choose the desirable loads and refuse service to the undesirable.

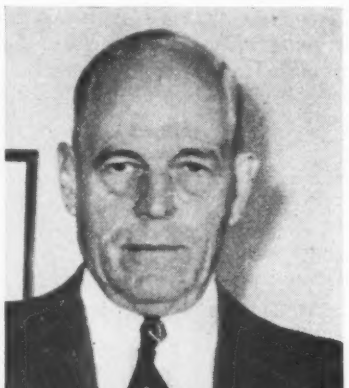
Our objective should be rates designed at compensatory levels for any size of load, no matter how composed, with all service supplied through a single meter of each kind needed. If we are smart, we will do that job now, before too many customers are affected. The American people have shown their determination to have electrical living. They are willing to pay whatever it costs, up to its reasonable value to them. What they don't like is to be told, after their installations are made, that we overlooked some of our costs in pricing for the service and are now obliged to increase our rates.

A story is told of a minor Soviet official who, after several months' tour of duty in the United States, was asked what his impressions were. "Some things are really magnificent," said the Russian thoughtfully, "but in other respects I am disappointed. The cities, for instance, are so poor in hygienic installations. Now, in the Soviet Union, you would find a delousing station for public use in every large railroad station. Here, in the United States, I've never seen one."

What that Russian failed to understand is that here we attack troubles at the source and before they have opportunity to become major difficulties. If we live up to that practice and do something now in our rate designs to adequately provide for the foreseeable residential loads of unusual magnitude, we will avoid the embarrassment of waking up some day face to face with the possible necessity of setting up "delousing" operations in our rate procedures.

C. A. Leland

C. A. LELAND, president of Iowa Power and Light Company, Des Moines, died suddenly on May 25 in that city following a heart attack. He was 61 years old.



MR. LELAND

Mr. Leland had been president of the Iowa company since 1933. He went to Des Moines in 1927 from Topeka, Kans., to become vice president and general manager of the Des Moines Electric Light Co. and Iowa Power and Light.

Mr. Leland's full name was Cyrus Austin Leland, although he was better known by either his initials or "Cy." Born at Eldorado, Kans., he was graduated in electrical engineering from the University of Kansas in 1910.

His early experience was obtained with the Allis-Chalmers Manufacturing Co., United Portland Cement Co., and the Kansas City Terminal Railway Co. By 1917, he was superintendent of the Atchison Railway, Light & Power Co., Atchison, Kans., to which company he

(*Continued on page* 279)

The Lawyer's New Tasks in Rate Proceedings

By Paul W. McQuillen
Partner, Sullivan & Cromwell

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 1, 1949

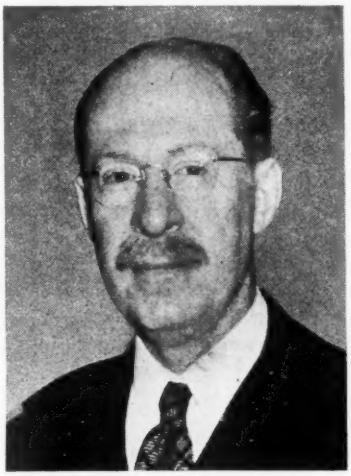
I WELCOME the opportunity to exhort the star players, here assembled, because it is you and not the lawyers who best can carry the ball in rate proceedings today. The lawyer must still be on the team, but not in the leading position he had in most of the important rate proceedings during the 20-odd years before 1946.

This may sound to some of you like a change in legal point of view, but it is in fact only a recognition of the change in the nature of these cases that has taken place. As a matter of legal procedure the positions of the parties have been reversed. Those who were formerly defendants resisting attack find themselves to be plaintiffs urgently seeking relief. In consequence the function of the lawyer for the privately owned electric public utilities has been radically affected although not quite reversed.

The New Rate Proceeding

Superficially it may seem that the three principal issues in any rate case are the same as they used to be and that the only big difference is the identity of the party asking for a quick decision. The first new task of the lawyer has been to look beneath the surface of the legal forms and behind the forms of old legal habits to find the real nature in these times of the interests he is called upon to advocate and of the interests of others with which he must deal. In so doing he has found a greater community of interests than might have been imagined and has tried to avoid the old type of rate proceeding as far as possible.

A glance back at the old type of rate case, though painful, will help to show by contrast why a lawyer does not now assume the old leading part which was then forced upon him. It was too often evident when a case was started by a commission in charge of rates or by a complaining city or other public body that it would be fought to the limit and that the utility must expect to take or resist an appeal. Naturally the lawyer had the most to say about the record that was to be made when his client believed it would go to the courts for final decision. The whole atmosphere was one of contest. Public officials assumed that the interest of investors was a private interest and the interest of consumers was a public interest and that the two were antagonistic. There seemed to be no doubt that there would always be plenty of surplus earnings and that the essence of all the problems was how to divide those earnings.



MR. MCQUILLEN

National Public Interest

When the late war burst upon us, we woke with a start to the realization that, above the old concept of the interest of consumers, there was a national public interest vitally dependent upon the supply of electric power. That brought us back to the fundamental common denominator of the interests of all persons concerned in any rate case —the public service itself—the now crying need to make sure that everyone will have or continue to have all the electricity he needs.

This is the first and the greatest of the interests we have to advocate for you and with you. Since the war it has been the most urgent. It is also the primary responsibility of the regulatory authorities and should be the consideration controlling the attitudes of local community officials.

In the early days of regulation, its main purposes were better understood. True, even then, the headline-catching object of blocking private monopoly exploitation of public resources was given the most publicity, but one of the great leaders in the movement for public control, the elder LaFollette, was very conscious of the fact that it was at least equally important for the utilities to become and remain strong, well able to do their job of giving good service and plenty of it. Survivors from those who worked with him say that he frequently reminded his supporters that regulation was meant to develop and safeguard the public service as well as the fairness of its cost.

Common Problem

Having found the original principle of rate regulation again brought to life by the surge of business after the war, it became the lawyer's task to suggest procedures that would help the authorities controlling rates to recognize and apply it. Now that you are gaining in the race to keep ahead of customer demands, it is our task to see that the basic purpose of regulation, to enable a utility to give all the service demanded, is not forgotten or obscured in a maze of methods contrived in the past by people struggling against each other instead of struggling together to solve a common problem.

At this point the lawyer passes the ball to you. The best way to help rate authorities realize that your problem is their problem too, is not to have a lawyer start a case or even to send a lawyer to speak for you, it is for you, the top management, to take the top officials into your confidence by personal talks which let them know the substance of your plans and the reasons for them. Try to pave the way for your organization to submit and discuss informally with the commission's staff supporting data already prepared, and any other information that may be requested. This procedure affords a chance of real expedition.

In most States the statutes permit a new rate to become effective at a speci-

fied time in the absence of a complaint by interested parties or suspension or disapproval by the commission. Time after time in the past this method has been used for rate reductions but too seldom has it been allowed to work the other way. There are, however, recent important examples of its use, notably in Pennsylvania where the commission has allowed large increases to meet evident needs without interposing the delay of formal proceedings.

Your industrial and large commercial customers are not surprised that you have to raise the price of your product —they have been several jumps ahead of you. In fact, the cost of equipment and other goods you have to buy from those classes of customers of your own industry is partly responsible for your own move. Nevertheless, it is wise for you further to prepare the way by preliminary talks with outstanding customers. If may also be prudent to tell your troubles and indicate your plans privately to elected officials of principal communities in your area. That depends so much, however, upon local conditions and experience that it is not possible to generalize about it.

While you are engaged in the preparation for, and the conduct of preliminary discussions of the sort suggested. your lawyer should. of course, be working with your staffs and with you in helping to select and express the ideas and organize the material in ways which will be legally sound and which may be followed consistently through any proceedings that result.

Formal Proceedings

In spite of your best efforts to obtain a change in rates without any need for further legal services, you may be unsuccessful and may have to go through a formal proceeding. In that event, the preliminary discussions should have smoothed the way somewhat and may have resulted in outlining and simplifying the case to be presented and may also have contributed to a more sympathetic consideration.

These remarks have dealt first with the general approach to the handling of your rate problems, because the outcome of any case may be greatly influenced by the way in which it is started and by the extent to which the compelling reasons for relief are made clear.

The next step is to marshal your proofs.

You do not have to look far to find out why you have needed more revenues in the last two or three years and why many of you will need more and more still for a few years to come. You are not immune to inflation. Your operating costs have gone up like those of everyone else and at the same time you have been called upon to finance an enormous expansion program,

The place where inflation has hit first and most acutely is in operating expenses. Undoubtedly you start with statements of current revenues and comparisons with those of the recent past and with estimates for the limited future that lies within the range of an intelligent forecast. Several points will be clear from any such comparison. One is the fact that utilities and commissions can no longer think in terms of only two principal classes of interested parties, consumers and investors. There is now a third important group to be weighed in the balance. The individuals engaged in performing the service have come to have so large a claim on revenues that any increase must be studied expressly to see whether it will provide fairly for the employees as a group as well as for investors and consumers.

Looking Forward

It will be clear from the face of any comparative statement for most steam electric operations that, while operating revenues have been increasing since the war, total expenses have been increasing at a rate which is closing the gap between the two. That is the most obvious and the most persuasive fact of all. It explains why there has been practically no objection from the public at large to the recent raises in electric rates. Most important and less to be taken for granted right now, is the forecast of any expected further increases in operating costs. In that respect your situation is somewhat out of phase with the recent signs of lower prices.

Explaining Your Forecasts

Special care should be given to the explanation of your forecasts. They should be supported by your load studies and the story of the surveys on which they rest. The need for, and nature of, new facilities to take care of the expected loads should be summarized by your engineers who should also be ready with all their detailed information. A description and explanation of contemplated new financing and resultant expenses should be given with the forecasts of operations and your financial men should be ready to answer questions about that. Finally, any major indicated changes in other operating expenses should be explained and supported by the departments directly concerned.

Recent earnings should also be compared with past earnings over a considerable period in several ways and for several purposes. Attention should be directed to the upward course of operating ratios and to the fact that management has limited power to cope with it.

Industry-wide statistics compiled by the Federal Power Commission for privately-owned utilities, Classes A and B, show that in 1947 total electric operating revenues increased by about $405,000,000 over the preceding year, but that in the same year electric utility operating income decreased so that it was $3,243,000 less than in 1946. This trend existed too long. There was a little change for the better in 1948 but not much. Total electric operating revenues were over $458,000,000 more than in 1947 but electric utility operating income was up only $25,000,000. Reports of results this year indicate some further improvement, with a fair share of the credit going to the rate increases allowed at various times last year.

Statistics of the Industry

Industry-wide statistics may assist in judging individual claims but each utility must, of course, show how it alone is getting along. A quick look at one large company shows that in the last 20 years gross earnings have more than doubled, plant has almost doubled and net income has gone down. In 1928 its gross earnings were over $52,000,000 and in 1948 over $120,000,000. At the same time its plant went from $229,000,000 to $416,000,000, in round figures, and its net income available for dividends and expansion went down from about $12,600,000 to about $10,400,000. How were the consumers and investors and employees faring over the same 20 years? In 1928, the average revenue per kilowatthour was 2.34 cents and in 1948 it was 1.86 cents, or a decrease of 21 per cent. The average wage per hour in 1928 was 81 cents and in 1948 was $1.69, an increase of 109 per cent. The stockholders did not fare so well. In 1928 their earnings per share were $2.81 and in 1948 the earnings were $1.49 per share, a decrease

of 47 per cent. The amount of stock in 1948 was 10 per cent more than it had been in 1928 but the capital of the company was that much larger. There was no increment of earning on the additional capital and the additional plant. As you may well imagine, that company has been granted a substantial rate increase.

Earning Data

No longer can it be assumed that private utilities are earning enough on their existing plants to attract new capital for new plants without allowing them some fair increment of earnings upon the increment to plant. The earnings data to be submitted, whether informally or as exhibits, should include separate analyses showing the changing relationships between property and earnings by periods and amounts and percents so as to make clear the extent of the differences in increments as well as the aggregate effects.

So far it has been assumed that utility books recording the dollars and cents received and spent or appropriated over any span of years, however long, will afford true statements of the incomes and of the costs of the properties. That is not peculiar to utilities. A like assumption has been made by business generally and is still made by accountants and by governmental bodies and agencies, both State and Federal. When the dollar had more stability that was a fair assumption. But the paths of history are strewn with wreckage caused by debased and inflated currencies. It would be foolhardy for the members of this industry, and for the public authorities which prescribe its accounts, to ignore the possible consequences while the managements of free enterprises are racking their brains to find safeguards for their situations.

Indirect Impact

It is the concealed and cumulative effects of this condition with which I am concerned. The direct impact of the swollen costs of current operations can be met, if permitted, by raising the current price and collecting more of the current dollars in which the current costs are both incurred and paid. The indirect impact, i.e., the charge to current operations for the year's share of the past cost of property being slowly consumed over many years, is not met by appropriating only the nominal amount of current dollars which would be required if they were the same as the dollars in which the cost was incurred. Do you suppose that anyone could fool a company or a commission on the border by paying an electric bill with an equal number of Mexican dollars? That is the same sort of disparity, though different in amount.

Letting property go that way is living off capital. It can be done for a while, but not indefinitely. The same is true of the deficit financing in which a company must engage when the time comes to make up the extra cost of replacement above full nominal depreciation provided in shrunken dollars. Steam power plants, for example, cost about half again as much as they did a few years ago, after allowing for technological advances.

That extra cost to replace an old plant with the identical capacity calls for new capital and does not give new production. Can you increase the unit charge for output in the same proportion? How often can you repeat that process? Will the old stockholders be compelled to provide new deficit capital from old surplus? Will they be allowed to earn enough to do it? Will outsiders be willing to subscribe if it is not the policy to keep their capital intact?

I do not profess to have a ready-made answer for this perplexing problem. I realize that the amounts involved to date for this industry are probably not large in relation to other industries or in relation to the size of your plants. It is only the shortages faced on retirements since 1945 that seem to be significant. It may be difficult to analyze your accounts to determine how much is involved and the basis on which any provision could be made and adjusted to provide fairly for the progress from year to year. Nevertheless, it is essential to know a lot more about the facts before the puzzle can be solved.

Depreciation Problems

In many ways the questions are akin to the old and still troublesome questions of ordinary depreciation. The estimating of service lives and the re-estimating of remaining service lives is a continuous process and the amount of the appropriations to be made from year to year to recoup the historical cost has to be decided every year on the basis of the best information then available. It might be possible to make close estimates of this new type of shortage for the last three years and to budget it ahead about as well as other construction costs.

Perhaps an amendment of the tax laws will set the pattern. Perhaps the fact of excess replacement cost may be taken into account by commissions without specific provision. More likely, I am afraid, until it becomes more serious, it will be disregarded as just one more cost you can absorb with the inherent benefits of larger volume. This subject should be pursued whether or not a rate case is pending or in prospect.

I have one caution. If any special charge or allowance is made it should be separately and carefully labeled so that it cannot be confused with the cost of expansion, none of which could properly be charged to consumers. A separate reserve for this special purpose would have the further advantage of reducing conflict or confusion with the rest of the accounts.

The exposition so far discussed inevitably will touch upon the other two principal issues—rate base and rate of return. If there is to be a formal proceeding you should go further and furnish the commission with all the ammunition it needs to make the findings which courts are insisting upon as essential for review.

Methods of Finding Rate-Base

Past practice in a given State may not leave much room for argument about the method to be used in finding a rate base. The statutes, however, and certainly the decisions of the United States Supreme Court, leave lots of leeway in most cases for the commissions to exercise a wide discretion in determining the method to be used in a particular case. It, therefore, seems prudent under present conditions to prepare and submit, in any jurisdiction where such evidence will be received, the best evidence of values of properties available within the time that can be spared and in places where the theory of original cost is enshrined, the method of its application should be re-examined.

Does it call for too much variation in rates of return for the same company at different times or between different companies at the same time? Leaving out any extra value flowing from the fact of devotion to the public service, was original cost originally taken to be the best evidence of value and the most reliable permanent measure of it? Is the original cost truly expressed when

it is not set forth in current dollars? Does it now serve the primary purpose of regulation, to build a strong utility?

Continuing Property Records

For the purpose of gauging values more use is being made of means to measure the differences in price levels between different times. The more closely such comparisons can be based upon a company's own records of costs the better they can be supported and the more secure they are against being rejected as mere estimates. There are several indexes commonly used by other branches of government and by businessmen for many purposes. I believe that when commissions become genuinely concerned about values they will follow the lead of the Ohio Commission which, being obliged to find values, has found values from such evidence.

Good continuing property records that go back for many years and similar records of wage costs, are the tools you need to construct your own index numbers. If you cannot go the whole way you may be able to derive enough information from your own records to show whether an index prepared by the Bureau of Labor Statistics or other source is fairly in line with your own experience.

The construction and use of such an index and the testing of it are more matters of mathematics, engineering knowledge and familiarity with the particular property than they are matters of law, but the lawyer should work closely with the property engineer preparing that evidence so that a solid legal foundation may be laid for its acceptance and so that its form and presentation may be designed to simplify the legal argument as far as the subject permits.

The Process of Rate-Making

Unless a statute otherwise prescribes, fair value may be the end product of the process of rate making and not the starting point, as the Supreme Court has said, but even then the result must be a reasonable one. Moreover, as the courts of Wisconsin, New Hampshire, Massachusetts and Vermont have recently and emphatically held, the conclusions about the rate base must be clearly stated and sufficient facts to support them must be found and set forth so that they can be reviewed by an independent judicial tribunal.

No matter how appealing the reasons may have been for the adoption of a particular rate base theory in the past, it is our task today to test it again by the practical results of its strict application on the old theoretical basis. If the result is incongruous, it is not sound. Unless the rate base is so established that it will confirm the confidence of past investors, and will attract rather than repel future investment in the Company, it cannot be regarded as fair and reasonable. It must be in harmony with the rate of return and it must be realistic. It must fairly represent under existing business conditions that portion of the entire assets of the community which are set aside for the public service and which must be paid what they are worth for that purpose.

New Property Investment

In this connection large programs of rapid expansion call for special attention in the computation of the rate base. This is not a question of value or prudence of investment. The actual new cost can be accepted under any theory and the pressing need for the investment can readily be shown. The point that must be emphasized is the fact that new property is being built and is going into service very fast and that the rate base, for which the new rates are to be established, will have been substantially enlarged by the new construction.

In the past there has often been a too meticulous subtraction of every bit of property under construction. At the same time requested rates are tested by a forecast of future earnings. The error is exaggerated when such earnings are compared to an average of property in service during a past year. Instead of looking backward, one should look forward in determining what property is to be included in a rate base and there should be added to the old plant already in service a fair allowance for the new plant to be placed in service during the period for which new earnings are estimated and taken into account.

In the long run there is no way to escape the consequences of discrimination against capital used for public service. The credit will go down and so will the standards of service. One root of all the difficulties about the rate base issue is the natural human tendency to simplify things and to try to find in some formula a safe refuge from the uncertainties of life which always persist in spite of a formula and eventually force its revision. There is no substitute for an informed judgment in this field.

Rate of Return

The same thing is true of the remaining issue, rate of return. In this case, moreover, the truth has been generally recognized. There is little argument over the legal principles governing the determination of a fair rate of return. The statements of courts and commissions, both state and federal, both old and new, are in substantial accord. It is in the application of those principles to concrete cases that difficulties are encountered, in both the preparation and the analysis of proofs.

Too little space is given in most opinions to a statement of the reasons why the evidence leads to the conclusion that the rate of return allowed has been found to be a fair one. Sometimes one might suspect that the rate of return resulting from a comparison of the adjusted earnings with the computed rate base has been held to be fair in order to support the rest of the decision.

Sometimes it seems to be influenced by a desire for consistency with other decisions in the same jurisdiction. Sometimes the result seems to be at variance with the evidence in the case. For example, in one recent decision now being appealed (in Mass.) it appeared from the statement of facts that the company's stock had been selling from 15 per cent to 20 per cent below par for several months while an emergency increase had been in effect and that the evidence indicated the need for some further increase to restore the company's credit, the difference in testimony being confined to questions as to what types and proportions of securities were desirable and as to what would be needed to support them.

Test in the Open Market

The opinion gave elaborate tables of financial records and comparisons, but concluded, contrary to the testimony by a banker, an economist, an institutional investor and an investment adviser, that earnings enough for a 6 per cent dividend and a very slight addition to surplus would maintain the stock at par or better in normal times and would give a fair rate of return at the present time. It allowed a permanent increase in place of, and about equal to, the emer-

(*Continued on page* 276)

The Industry's Part in the Financing Program

By Harold H. Scaff
Vice President, Ebasco Services Inc.

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 2, 1949

THE Industry's financing program has been the subject of active discussion for more than a year and its relative importance has increased, rather than diminished, during that period.

The expansion program requiring this heavy financing is as vast an undertaking as ever confronted the electric industry. A survey conducted several months ago by the *Electrical World* shows that the industry plans to spend approximately $8.7 billion during the five-year period ending 1953, which compares with an estimate made a year or so ago of $6 billion for the four-year period ending 1951. These figures alone demonstrate that the financing has become increasingly vital to the industry.

The *Electrical World* survey shows the sources from which it is expected that the funds must come and the amounts required for each of the five years.

Capital Sources Survey

The information is as follows:

	1949	1950	1951	1952	1953
	in millions of dollars				
Total	$2,050	$1,830	$1,620	$1,630	$1,560
Debt	820	732	648	652	624
Preferred	205	183	162	163	156
Common	410	366	324	326	312
Cash	615	549	486	489	468

To date, debt money is being obtained in amounts sufficient to meet the requirements, and generally at reasonable rates. This part of the financing program does not appear likely to present any problem to utility companies.

Based on recent past experience, however, the same cannot be said for that part of the program involving equity financing. The tabulation I have referred to shows that the industry will require $615 million from preferred and common stock financing during 1949.

One indication that this is going to be difficult to accomplish is that for the year 1948 electric utility companies obtained only $288 million in new money from preferred and common stock financing. While the first quarter of 1949 shows some improvement, indicating an annual rate of about $340 million, the current rate is still short of the indicated requirement of $615 million for 1949.

MR. SCAFF

The problem of raising equity money is not new, it has been with us for two years or longer and has resulted in the sale of debt securities in proportions greater than the proportion in their existing capital structures. For instance, in 1947, debt securities were about 60 per cent of all securities sold by electric utility companies to obtain new capital, including surplus plowed back into the business. In 1948, the figure was around 69 per cent.

Preponderance of Debt

To date, the preponderance of debt has not affected, in any important degree, the sound capitalization of the industry. At the end of 1948, the industry's total long-term debt was only about 49.1 per cent of total capitalization, as compared to 46.1 per cent at the end of 1946; and common stock and surplus 37.0 per cent against 38.4 per cent. It is essential, however, that equity financing continue in heavy volume if the industry's present extremely sound position is to be maintained.

On this point, Hon. Edmond M. Hanrahan, Chairman, Securities and Exchange Commission, had this to say in an address before the American Gas Association at Atlantic City, N. J., on October 5, 1948:

"However, I am not betraying any secrets when I say that we at The Securities and Exchange Commission are disturbed by the fact that many utility corporations, electric as well as gas, and indeed, many corporations in other lines of activities, have, since 1945, relied so heavily on debt financing to meet their expanding capital requirements."

This is another factor that makes the financing program more important today than it was a year or so ago. The industry now faces generally the necessity of resorting to equity financing for a somewhat larger share of its new capital requirements than during the past two years.

High Cost of Equity Capital

The high cost of equity capital over the past couple of years has been the dominating factor influencing companies to decide on the debt route to obtain most of their new capital requirements. This decision can be readily understood if consideration is given to the desire of companies generally to keep the cost of capital as low as possible.

A study prepared recently by my organization, showing quarterly earnings price ratios on common stocks of 8 high-grade electric operating companies, indicates that the cost of such money has gone up from a low in March, 1946, of 4.78 to 6.84 per cent in March, 1949. This represents an increase of almost 43 per cent in a period of three years, and as can be appreciated, throws a heavy burden on these companies.

A number of factors account for the increase in the cost of equity money. Among them are, apprehension on the part of the investor about the impact of the industry expansion program on the earnings of the companies, government competition, regulatory commission attitude toward rates, increasing operating costs, the effect of competitive bidding on the industry's ability to market equity securities satisfactorily, and high taxes.

Largely because of these conditions,

the electric industry, through Edison Electric Institute, created about a year ago a committee to function jointly with the American Gas Association to study and report to the membership of both associations on the subject of "Financing Utility Capital Requirements." I had the privilege of being selected as Co-Chairman to work with Mr. E. W. Morehouse, chosen to represent the American Gas Association.

The objective of the committee was the preparation of a report that would contain recommendations and suggestions to individual member companies that would help to facilitate the successful financing of their expansion programs. This was to be done by building up investor confidence in electric and gas securities, thus providing a ready market for such securities at the best possible price.

After considerable study and discussion among the members of the joint committee, and contact with several groups outside the two industries, it was concluded that the over-all problem should be divided into six parts for committee study and reporting. The six subjects are:

Information Programs
Relations with Investors, Underwriters and Dealers
Earnings Needed and Allowed
The Effect of Competitive Bidding on Utility Financing
Characteristics of Securities
Impact of Federal Taxation on Utility Financing

I want to review briefly these subjects, because of their particular interest to the electric utility industry, and to tell you a little about the conclusions of the committee as to each of them.

Information Programs

There is no subject of more vital concern to the industry in connection with its financing program than the necessity for better industry and company information programs. I want to cite an actual experience of the electric industry to show how harmful an inadequate information program can be.

Shortly after the industry announced its $6 billion expansion program early in 1947, utility stocks went into a decline which continued for almost a year. This decline was contrary to market action generally and in my opinion resulted largely from the misunderstandings that arose as to the impact of the expansion program on earnings. I am sure you will recall the numerous articles that were written about that time on the subject that helped to make matters worse.

It was not until much of this fear had been dispelled by pointing out the many benefits that were going to result from the expansion that utility stocks started to regain the ground they lost during that period. Had the industry taken the time and the initiative to put out a full statement explaining the effect of the expansion program, the industry would not have received the bad publicity it got, nor would stocks have declined contrary to the general market trend.

A great many utilities feel that if they do a good job locally in explaining their situation to the investing public, they have done their share. Unfortunately that is not so.

"Fuzzy" Distinctions Between Companies

The hard facts are that the public considers the utility business as an industry. Opinion surveys show that most people are very "fuzzy" about distinctions between various companies. Adverse situations affecting one company tend to harm others in the business.

This is not all in the minds of the investors, either; a bad situation does affect others as well as the company experiencing it. But the utility business does not as a rule, act, think, or talk as an industry. If it is to cope with the situation which now confronts it, it cannot continue on its present individualistic course. An information program on the national level is an urgent need.

I understand that a movement has been started within the industry to fill this urgent need. Substantial progress has already been made; a number of companies are now participating, and the program is a going concern. But it cannot be a complete success unless it has the support of the entire industry. By support I not only mean subscribing to it; that is necessary of course. But that alone will not be enough. The leaders of our industry—our top men—must take off their coats and work at the job of selling the utilities as an industry, to the people of the United States.

The program also should be carried out on the regional and the grass roots' local levels.

Greater use should be made of newspapers, financial publications, trade magazines and similar sources that reach the potential investor, as well as present investors. It is essential to keep those who can help fully and currently informed on all aspects of the industry's business.

Relations with Investors, Underwriters, and Security Dealers

A large number of electric and gas utilities have been confronted recently with the new experience of maintaining relations with investors, underwriters, and dealers. These relations were formerly of little or no concern to executives of those companies because holding companies largely assumed responsibility for the equity financing of their operating subsidiaries.

Now, companies only recently divested from holding company control, together with most other electric and gas utilities, are confronted with the problem of raising substantial amounts of money for new construction. Good relations with investors, underwriters, and dealers are of paramount importance to the successful completion of these financing programs.

Good investor relations do not just happen, they have to be achieved. Once attained, they must be maintained by unremitting attention. They are the means of instilling confidence among investor groups that the utility is a good investment risk.

Investors fall generally into two broad groups, one consisting of institutional investors and the other individual and other investors.

The institutional investor group, generally, is made up of those who make investments their business, and who purchase securities on a large scale. In this category are insurance companies, investment trusts, banks, and trust companies, investment companies and similar institutions. Generally, those investors rely on their own staffs, the financial and statistical services, or retained consultants to supply them with detailed data on a company in whose securities they may be interested.

The individual investor group is made up of people of all walks of life and interests. For the most part, their purchases of securities are limited to relatively small amounts. For many companies, they are largely company customers, employees, and residents of the area served. Their views on the company and their actions in regard to it,

can therefore have an immediate and important bearing on the company's affairs.

The single most important medium available for informing all investor groups about a company is the annual report to stockholders. It is the medium where the company can report fully on its contribution to the economy of the area it serves and can address its employees and customers. It is the place where management can and should present its case in a fashion that will attract readers.

The annual report should be based on a statistical and financial review of the company's affairs, without being an entirely statistical and financial presentation. Information in it should be comprehensive, significant, up to date and consistent.

Interim reports should be sent to stockholders to keep current the important financial and operating data in the annual report. These interim reports are most necessary for security analysts and investment bankers.

Financial and statistical agencies send out their own questionnaires for filling in by utilities. It is definitely in the company's interest to furnish the information required.

Rating agencies play an important role in the cost of money to the utility. An informational brochure can be utilized to supplement the annual report in times of financing. This special report can be used to acquaint those agencies, as well as investment bankers, with operating and financial data which may be beyond the practical scope of either the annual report or the registration statement.

Another special report is what might be called the "picture book." Its purpose is to publicize and interest people in the company by illustrating its properties and territory. Movies and slides are also used for that purpose.

Investor Relations Meetings

Meetings should play a very important part in investor relations programs. Some of the groups with whom meetings are desirable are commercial bankers, investment bankers, institutional investors, investment counselors, financial and statistical agencies, security dealers and brokers, and the financial press.

The maintenance of good relations with bankers, underwriters, and security dealers is of utmost importance to the successful financing of the utility expansion program. It is essential that this group be well informed on the investment quality of utility securities. Many checks have shown that a large proportion of individual security holders purchased the particular securities that they own on the recommendation of either (1) their commercial banker, (2) a security dealer, or (3) on the advice of someone who was acting on the advice of one or the other of the first two.

Each company should analyze its own list of security owners to learn where it is already favorably known, and to gauge how broad a market it is desirable or feasible to reach in order to raise the funds required. A program of banker and dealer contacts that will be broad enough to accomplish the desired results only then can be outlined satisfactorily.

The most effective method of keeping bankers and dealers informed is by personal contact. A thorough, continuing and effective job can be done best by assigning this task as the principal duty of one of the officers of the company.

Earnings Needed and Allowed

Adequate earnings are a prerequisite to successful equity financing. This is the reason why the determination of requisite and allowable earnings is so important to the electric industry. The ability to obtain new money from common stock financing in amounts adequate to meet the requirements of the industry, requires earnings at a level that will support the new equities at least as well as outstanding shares.

One thing that should be done as far as earnings are concerned is to place utility stocks on a better competitive basis as compared to industrial stocks. On an industry-wide basis, only a relatively small percentage increase in revenue would be required to improve the approximate 25 per cent price disadvantage of utility common stocks compared to industrial stocks at currently demanded dividend or earning yields.

Regulatory bodies that are not already cooperating can help the earnings picture by bringing their ideas more closely in line with current conditions, by abandoning rigid adherence to theoretical rate-base and rate-of-return theories, and recognizing rate bases and rates of return that will yield earnings sufficient to attract capital now and in the future. They should re-examine their methods and principles to give more recognition to the fact that rates are fixed for the future and not for the past.

This would mean giving more weight to anticipated plant investments, as well as required earnings. In fact, this has recently been done in the case of some companies such as Northern States Power Company by the Wisconsin Commission.

Procedures should be simplified and proceedings expedited by using the conference method wherever statutes or other conditions permit. After all, the problems incident to financing the expansion programs are economic and business problems; they are neither legal nor political. Speeding up the regulatory processes will aid greatly in making it possible for companies to "catch the market."

Regulatory bodies and utility companies should cooperate closely in scheduling the consummation of divestment orders and security-issue authorizations so as to avoid "glutting the market."

Effect of Competitive Bidding on Utility Financing

It appears that Rule U-50 and Competitive Bidding are generally adapted to high- and medium-grade utility bonds. On investment grade bond issues of medium size ($10,000,000 to $35,000,000), where no special factors complicate the situation and require special sales efforts, competitive bidding has been satisfactory.

On lower grade bonds, the experience under competitive bidding has been very limited. There is a general belief, however, that where special circumstances (such as a lower-than-investment grade rating, or temporary low earning power due to special circumstances) affect an issue, a negotiated sale or a private sale is more advantageous, even as to price. This is due to the fact that an underwriter can afford to spend a substantial amount of time and work on an issue, if he is sure of his commission, whereas if he is only one of four or five bidding on an issue, he cannot afford to do an "individualized selling" job to get the best price for the issuer.

As regards preferred and common stocks, the comparatively weak market in these issues since mid-1946, particularly in the medium and lower grades, has made competitive bidding unsatis-

factory to the banker, the investor, and the issuing company. The need for individualized selling and the great importance of timing resulted in substantially greater amounts of both preferred and common issues being sold during 1947 and 1948 under negotiated placement, than under competitive bidding.

In view of current market conditions and the importance of obtaining preferred and common stock financing with as little hindrance as possible, the committee makes the following recommendations:

That the Securities and Exchange Commission temporarily suspend the applicability of Rule U-50 to sales of electric and gas utility preferred and common stocks and adopt a new rule providing that such sales may be made by any method, providing that the Commission retains jurisdiction over the reasonableness of prices and spreads. The suspension should be made permanent if, after a trial period of two years, the new procedure is found satisfactory. It could be revoked at any time if the Commission found there was a return to conditions which it determined were unsatisfactory.

That the Securities and Exchange Commission increase the exemption from competitive bidding on debt transactions to $3,000,000 in any one calendar year, from the present level of $1,000,000.

Characteristics of Securities

Because of the increasing number of special features being injected into the securities under a financing plan, it seemed desirable to study and report on the characteristics of securities.

Mortgage bonds have established fairly definite patterns with respect to sinking funds, maintenance and replacement funds, dividend restrictions and certain other features.

The number of debenture issues have been too few to establish any particular pattern, and the indentures under which they are issued are hand-tailored to meet the problems of the particular companies involved. Generally, substantial sinking funds are required, the indentures contain more restrictive provisions, and interest rates are higher than rates for first mortgage bonds.

Convertible debentures have been used to some extent in financing programs. Depending on the conversion features, interest rates compare favorably with rates of first mortgage bonds. They are generally offered to common stockholders and the subscription record has been extremely high.

Frequently, common stocks of utilities have been offered to stockholders at a price below current market before it is offered to the public. This enables the stockholder to maintain his proportionate equity in the enterprise. In most instances the offering price was within 20 per cent of the current market price. During the offering period there were no substantial variations in the price of the stock, and the price at the close of the offering period did not vary substantially from the price one week before the offering period.

Impact of Federal Taxation on Utility Financing

Federal taxation has had a substantial effect on the financing programs of utility companies. The decline in the ability of the high-income groups to save, resulting from the tremendous increase in personal income taxes, has had an important influence in restricting the sale of corporate equities.

Another effect of these heavy taxes has been to shift investment preference to tax-exampt state bonds. For a single person with an income of over $60,000, there is no difference in yields between New York State tax-exempt bonds and an average common stock investment yielding 6.4 per cent before taxes.

Two decades ago a substantial amount of savings from the middle-income group went into equities, whereas this group now seeks security in additional insurance, pension plans and the like. These moneys are channeled into institutional hands which are generally limited to investment in debt and to a small amount of preferred. These limitations combine to result in a shortage of equity capital.

Tax relief for utilities would undoubtedly help to induce utility equity investment. For example, one of the obvious forms of special relief might be the repeal of the federal electrical energy tax, which is generally recognized as discriminatory against privately owned electric utilities and excessively expensive to administer. Tax relief for individuals also would help utility equity investment.

In conclusion I want to point out that the committee that was charged with the responsibility of studying the subject of financing utility capital requirements has completed its work and the report is about ready for printing. The matter is now in the hands of the electric utility industry, as well as the individual electric utility companies, to carry out the suggestions made by the committee.

If real benefit is to come from this work and the financing programs are to be assured of success, it must result from the initiation of plans and the adoption of programs which will carry forward this work vigorously.

Indiana Electric Association's Ninth Annual Young Men's Utility Conference

(*Continued from page* 236)

from taxation as one of the greatest dangers of public power.

Concluding the first session, J. Calvin Hill, division manager, Indiana & Michigan Electric Co., reviewed the "Opportunities in the Electric Industry."

The "Functions of Company Departments," a speech delivered by Marvin Evans, Southern Indiana Gas & Electric Co., started off the next session on the morning of May 3.

Stressing the need for recognizing the human element in safety programs, Ralph Young, Public Service Company of Indiana, Inc., spoke next on "Democracy in Safety." There followed an address by Dr. G. Edward Pendray, public relations consultant, American Gas & Electric Service Corp.

J. H. Smale concluded the session with a discussion of the "Responsibility of Young Men in the Electric Power Business."

Following a luncheon at Ipalco Hall, A. J. Stilwell, vice president, Continental Illinois National Bank and Trust Co., began the final session with Frank Bush, Public Service Co. of Indiana, Inc., presiding, by describing "Economic Conditions Now and Then." Bringing the conference to a close, R. J. Kryter, treasurer and sales manager, Esterline-Angus Co., then outlined many of the new uses now possible for atomic energy.

Long Term Lease Financing and Its Applicability to Electric Utility Companies

By William W. Bodine

Financial Vice President, The Penn Mutual Life Insurance Company, and former President, The United Gas Improvement Company

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 2, 1949

THE electric utility industry made an enviable record in meeting its responsibilities during the difficult war period, and since that time you have been engaged in the vast endeavor of getting your systems in balance once again to take care of pressing requirements and future growth.

To meet the heavy cash demands, there has been a constant outpouring of securities which, by and large, have been well received. Securities issued have run the whole gamut from first mortgage bonds, long- and short-term debentures, debentures convertible into common stock, short-term bank loans and serials, standard preferred stocks, preferreds with sinking funds or conversion privileges, and common stocks distributed under a number of types of plans. The industry has proved its versatility in meeting the situation confronting it.

Purchase-Lease Financing

But I am not going to discuss your financing problems as a whole, rather to bring you a few thoughts in connection with a somewhat recent type of financing, the purchase-lease arrangement; the question "if and how it has a place in the financing of the electric utility industry," and its relationship to the more conventional corporate securities.

The purchase-lease plan, as such, is basically a simple transaction involving the purchase of existing real estate and improvements or the construction of new buildings, and the execution of a long-term lease to a corporate user.

However, as developed, it differs from an ordinary lease so as to make it for all practical purposes a new and separate medium of financing or investment lying somewhere between pure ownership of real estate and ownership of full-faith and credit obligations of the tenant company.

Under the plan, the tenant offers

MR. BODINE

greater protection to the real-estate owner than under an ordinary lease, and the owner grants more favorable rent and other terms to the tenant.

The agreement results from a balancing of the credit strength of the tenant together with the value of the real estate, in the light of its location, construction, physical condition, other use possibilities, etc., and the interest factor and amortization schedule which the rentals will provide.

Rental Payments

The rental payments are usually on a net basis, the tenant paying real estate and use taxes, fire, and other hazard, insurance premiums, cost of maintenance and repairs, etc.

In arriving at a proper schedule of rentals, certain fundamentals must be kept in mind.

1. In event of reorganization or bankruptcy, a lease may be rejected and in such event the Trustee's obligation for rentals would not extend beyond a period of one to three years succeeding the date of surrender of the premises. This is a sound reason for a differential in interest rates between those used in general credit obligations and those used in fixing real-estate rentals.
2. The investment is relatively unmarketable for a long period of years, and regardless of changes in the suitability of the location or type of the property, or in the successful operation of the tenant, there is no way to offset adverse trends.

In fixing the rentals, it is important that there be a principal factor sufficient at least to keep pace with normal depreciation of the property. Consideration must also be given to the question of whether the buildings are of a special-use character or were constructed in a period of excessive building costs.

Renewal Options

An outstanding feature of the purchase-lease plan is the free use of renewal options at modest rentals after the base term of the lease. This has the two-fold purpose of making the rentals during the base term sufficiently high so as to provide a reasonable principal amortization and at the same time a lower over-all rent when renewal periods are included, in addition to assuring the tenant use of the property over a very long period of years.

When, for example, the base term runs for twenty-five years, the rent for the first ten-year renewal might be about one-third of the base rent, and for any successive ten-year renewal periods thereafter, about one-sixth of the base rent. Where there are no renewal options and the property will be of little value after expiration of the lease, the interest factor in the rent would have to be somewhat higher.

As in the case of general credit obligations, the credit of the tenant influences not only the interest rate, but also the other terms of transaction. While this is a factor in determining the length of base lease period, it has greater effect

in connection with new properties built at high construction costs.

Under those circumstances, it is important that the investment be written down within a reasonably short period to a figure which will make the property competitive with others built in a period of more favorable construction costs, especially in cases where possibility of a lease default is greater, or where the property is not of a general-use type. This can be accomplished either by a direct cash contribution by a tenant of an amount equal to excessive costs over long-term value, or by the use of a split rental plan where a higher rent is paid during the early term of the lease and a reduced rent thereafter, making a lower average for the whole base period, but providing faster amortization in the early years.

Rent schedules are based upon annual payments sufficient to amortize the investment within the base period, the interest factor depending also upon whether or not the tenant has favorable renewal options after the base term. While the lease may be longer or shorter than twenty-five years, under ordinary conditions and considering all factors, a term of approximately twenty-five years seems most desirable. While the return of principal factor should be sufficiently large to keep pace with actual depreciation of the buildings, it should not be greatly larger than that allowed to the owner by the tax authorities; otherwise, he will have to report as taxable income what is actually a return of principal.

Tax Advantages

While a great deal of publicity as to the tax advantages accompanied some of the early purchase-lease transactions, yet the primary purpose is, and should be, the release of funds out of bricks and mortar into working capital. The tax situation is but secondary.

It is important, however, that something be said about taxes from the standpoint of deductibility of annual rental payments as well as capital gains and losses.

As to annual rental payments, from a deductibility standpoint there will be no great variance between the rental payment and the sum of interest and depreciation available in case of direct ownership. As to capital gains and losses, in some of the earlier transactions, properties were sold at prices which varied from either book value or cost. Sales that produce capital gains are generally unwise because the seller must pay both the tax and a higher rent based on the higher cost to the owner.

As to the sale of older properties for tax-loss purposes, it is doubtful whether such loss could be established where a long-term lease is concurrently made at reduced rentals showing a sufficient saving to offset the capital loss.

As to sale of new property at less than cost (which might be necessary in the case of specialized types constructed at high cost levels), it is unlikely that a tax loss can be taken, but the difference between cost and sales price would probably be considered as a lease improvement depreciable by the tenant during the life of the lease.

Repurchase Options

An important item in the review of the tax status of rental payments is the existence of a repurchase option, one of two main classes having been used in some leases—(a) rejectable options, and (b) absolute options.

(a) *Rejectable Options:* Often the tenant asks for protection against the possibility that the property may become unsuitable for its uses, and the owner grants the right to cancel at certain periods predicated upon a repurchase offer at an agreed figure, which offer can be rejected by the owner and the lease terminated. Not being an absolute right of repurchase, this should not affect the deductibility of rental payments.

(b) *Absolute Repurchase Options:* The existence of an absolute repurchase option at a nominal amount may make the transaction look like an installment purchase contract, rather than a *bona fide* lease, with consequent effect upon the tax status of the so-called rental payments. How large a repurchase price would have to be in order not to be judged as nominal is a matter for counsel to decide. However, a plan which looks likely to stand up is an option to repurchase for land value after the buildings have been completely depreciated.

It will be noted from the foregoing that it would be easy enough to apply such a plan to the general-purpose buildings of an electric utility company, such as general office buildings, branch offices, sales rooms, warehouses, service buildings, garages, etc. Whether it is advantageous for the company to do so depends upon a number of factors as for instance, the jurisdiction of various governmental regulatory authorities, a comparison of the tax and accounting positions under this plan, versus direct ownership and financing, and other considerations.

Interest and Amortization

By either method all charges such as taxes, insurance, repairs, etc., would be identical except for the interest and amortization items. In case of direct ownership the interest would be somewhat lower. Under the purchase-lease plan, both interest and principal factor representing rent would be an operating charge, but probably should be treated as an income charge for the purpose of calculating ratios in connection with the issuance of securities. Under direct ownership, in addition to a deduction for interest, the Company would also have a deduction for depreciation which might be the same as the principal factor in the rental, but this would be a cash transaction if used in debt reduction, and would not appear as an income charge.

Credit can be used only once. If you use it for purchase-lease arrangements, it cuts down by just that amount the balance of the credit remaining for other purposes. If the same building were financed by the sale of securities with the ownership resting with the utility company, the cost of the building could be included in the rate base, whereas under purchase-lease it is questionable whether any amount could be so included.

Large-Scale Financing

The electric utility companies usually raise a considerable sum of money in one operation, but this is not always practical under a purchase-lease plan, which in many instances covers only one building. This means the negotiation of a number of purchase-lease arrangements, if the company is to use this means of financing on a large scale, with varying amounts and differences in the length of term and interest rate, on account of the location of the buildings and the purposes for which they are built. The company should therefore develop a standard form of agreement and, for simplicity, work with one investor, as once having established a satisfactory pattern, subsequent transactions could be expeditiously handled.

If you contemplate purchase-lease transactions to an important amount, consideration should be given to the effect on the sale of additional common stock. The leverage factor produced by debt at low interest rates creates a part of the earnings for the common stock, and the interest factor in purchase-lease transactions is higher than the interest usually paid on first mortgage bonds and other evidences of indebtedness, including debentures and bank loans.

Obviously, before selling and leasing back any property now owned, you will have to be sure there is no conflict with the terms of any mortgage or other indenture which may be outstanding, and the same with respect to new properties which are to become the subject of purchase-lease, if title is originally taken in the name of the ultimate tenant.

Construction of Generating Stations

So far I have confined myself to discussing purchase-lease transactions covering general-purpose properties. There is another phase of the business which may possibly lend itself to this form of financing, and that is the construction of electric generating stations. To the best of my knowledge, no such transaction has been consummated as yet strictly on a purchase-lease basis, but many of you will remember the somewhat restricted popularity in the thirties of separately financed electric generating companies—a plan still in use in some instances.

Fundamentally, this method of financing was not too far removed from the purchase-lease transaction involving, as it did, a rather heavy proportion of capital requirements raised by debt which was paid off rapidly through substantial depreciation charges, a minimum of equity being originally provided. The leases called for a rental sufficient to service debt and pay dividends, as well as all operating expenses, taxes, etc. The generating company was an entity unto itself and operated its property for the production of electric energy, usually sold to its parent who was also the lessee.

Institutional Investors

The purchase-lease differs from this plan in that the electric generating plant is built and owned by an institutional investor, and leased to the electric utility company at a net rental sufficient to meet interest and amortization. If the latter were equivalent to the depreciation allowed on the investment in the generating station, it would permit a full payout in thirty to thirty-five years. In order that the investing owner not be considered a public utility, the company to which the plant is leased would conduct all operations in its name, and maintain the property.

Additions and betterments could be provided for as leasehold improvements, ultimate disposition thereof being provided for in the lease. Unless electric generating stations can be included under the purchase-lease plan, the amount of capital to be provided in this manner for the average electric utility company may well be less than 5 per cent of total capital requirements, as general-purpose buildings account for a relatively small proportion of fixed capital.

There are many elements which enter into the consideration of such a purchase-lease plan for generating stations. Is it in the public interest? Is the cost satisfactory in comparison with other methods of financing? What is the effect on future financing requirements of the company? Many other phases will be developed as you get deeper into the details.

Jurisdiction of Regulatory Bodies

From the investor's standpoint, there are also problems to be resolved, such as the jurisdiction of regulatory authorities and the conflict in the statutes of various states governing the investment of their funds. For example, some states do not permit one life insurance company to participate with another in the ownership of real estate. In the case of a large new generating station and in order to provide for future extensions, it might be necessary to create a separate corporation to own the plant, the stock to be owned in the same proportion as the debt, although the ownership of common stocks by life insurance companies is not permitted by some states.

So the purchase-lease plan has its advantages and its disadvantages, and, as you can see, there are a number on each side of the equation which must be considered in the light of the particular company in question and its requirements, present and future.

There is a modification of the purchase-lease plan involving the interposition of a third corporation between the electric company and the institutional investor.

Under the modified plan the third corporation taking title to the property makes a long-term lease to the electric company and finances a very large percentage of the cost by means of loans from life insurance companies or banks. Such loans can be secured by a mortgage on the real estate, an assignment of the lease and a pledge of the stock of the third corporation, or one or more of them.

The paid-in value of the common stock of these third corporations is relatively low and the possibilities for increment in value are considerable.

Arkansas-Missouri Power Co. Case

A plan of this general type was considered by the Federal Power Commission* in March of this year in the case of the Arkansas-Missouri Power Company and the St. Francis Electric Generating Company (the third corporation). The Commission decided, "The separate corporation appears to be merely a technical device to divorce the ownership of the generating facilities from Ark-Mo's corporate structure, but the leasing arrangement indirectly merges or consolidates them with those of Ark-Mo. It is clear that the purpose of the adoption of the St. Francis Plan was to permit practically 100 per cent debt financing of the new generating station. Actually the stock of St. Francis, to be distributed to Ark-Mo stockholders, would have a paid-in value of less than one-half of 1 per cent of the total capitalization of St. Francis and, if traded in, would have unsound speculation possibilities."

The Commission went on to say, "Considered on a consolidated basis, the present capitalization of Ark-Mo and the proposed capitalization of St. Francis would consist of 79.1 per cent of long-term debt and 20.9 per cent of equity capital, as contrasted to Ark-Mo's present capital structure of 63.6 per cent long-term debt and 36.4 per cent of equity capital."

The utility company had proceeded with the negotiation of the plan and with the construction of the plant (to be taken over by the third corporation and completed) upon the assumption that the Federal Power Commission had no jurisdiction over the proposed leasing arrangement, and the case came before the Commission only a

* Opinion No. 176 In the Matters of Arkansas-Missouri Power Co., etc., Docket Nos. E-6185 and E-6195.

short while before the expiration of the financing commitments.

The Commission therefore said, "Applicant's complete reliance on . . . (the leasing plan) . . . has resulted in a condition which it appears at this late date can only be immediately relieved by consummation of the plan in some form. . . . We can only find that the plan, even subject to the conditions which we shall impose, is compatible with the public interest because of the circumstances which we have heretofore mentioned. . . . Because of those circumstances, we will give such conditional approval only as a temporary solution to allow Ark-Mo sufficient time to complete a long-range program of financing on a sound basis that will enable it to go forward with construction to meet the growing demands of electric energy in its territory."

Debt-Equity Ratio

The following excerpts are from a talk by Harry A. McDonald, Commissioner, Securities and Exchange Commission, before the Philadelphia Securities Association, April 27, 1949:

"At the SEC we do not make a fetish of any particular numerical ratio of debt to equity, but we do have touchstones—and we do insist, to the limit of our powers, on a balanced capital structure. A particular ratio which is healthy for one company may be inadequate or overly conservative for another. A certain amount of leeway and flexibility is necessary. The important thing is that there always be a sufficient equity cushion to withstand the shocks of the business cycle . . . We are also opposed to the use of financing techniques which tend to obscure the real nature of the transaction and give a false appearance to what is taking place. I am referring, particularly, to the lease-back device, recently grown so popular in the commercial field, which has appeared in several utility financing projects. The lease-back in utilities is designed to increase indebtedness while avoiding the appearance of doing so. Any appraisal of its effect should look beyond the form to its over-all effect on the capital structure of the consolidated operation."

The foregoing quotations relate the purchase-lease plan to the problem, which is fundamental to any type of financing in any type of company, whether it be an industrial, a railroad, or a utility, namely, the question of how much debt or fixed charge, if any, is appropriate in the case of a given industry and company and under the particular circumstances. For example, many companies should have no debt other than current bank accommodation; others may properly incur debt for a specific purpose, to be paid off over a reasonable term of years; and still others, as in your case, may have debt as a more or less permanent part of their capitalization.

I am not going to build a case for financing by the purchase-lease plan or some modification, but I do say that we must not eliminate from our thinking any possible type of financing merely because it is relatively new and untried, with little experience to rely on as a guide. That is the situation with respect to the principles of purchase-lease as applied to the financing of electric generating stations.

I can think, for instance, of a hypothetical situation where such financing would seem to me to be desirable and entirely justifiable. Take an interconnected power pool to which a number of companies are parties, and let us say that the load centers have been such that it has been advantageous to the whole for one company not to develop generating capacity to any degree but to purchase its requirements from one of the other companies. Then comes the time when the load distribution dictates additional generating capacity in that company's charter territory.

It may well be that the funds to be raised represent a substantial percentage of the company's outstanding securities, too great to be easily absorbed by the market at one time. What, then, is the company to do? Is it to sell some bonds, some preferred stock, and some common stock over a period while the generating station is under construction and thereby take a chance on future market conditions while being bound by the obligation of completing the new station, or should it seek assurance of its financing? A purchase-lease or modified plan might well accomplish that purpose, of necessity involving charges for a period of years (purchase-lease) or substantial initial debt to be rapidly amortized (modified plan).

No capital structure can be inflexible over the years—always a certain percentage of debt and fixed charges, a certain percentage of preferred stock with its dividends, and a certain percentage of common and surplus.

Please note also that in my hypothetical case the distributing utility company would be doing exactly the equivalent of what it did in the past in purchasing power, namely, paying a price which includes all operating expenses, taxes, depreciation and a return on any money it had invested in the plant. Of necessity the cost of purchased energy includes the cost of money and depreciation, which would certainly be at least as great as the interest and amortization factors in rental payments under a purchase-lease.

In closing, let me say that there can be no subterfuge for long in the market place, for it will find you out. Any plan of financing must be open and aboveboard, fundamentally sound and in the long-run interest of the issuing company, and therefore of its security holders.

That is more true today with the tremendous growth in the institutionalization of the people's savings. The institutional investor is a trustee of those savings and, at least in the case of the life insurance companies, a long-term investor not interested in market fluctuations, but in the soundness and continuing success of the enterprise whose securities it buys for the long pull.

S. M. Dean

SAMUEL M. DEAN, chief engineer of the electrical system of The Detroit Edison Company, died May 31 at Detroit, Mich., of a heart ailment. He was 57 years old.

Mr. Dean was born in Traverse City, Mich., and was graduated from Michigan State College with a bachelor of science degree in electrical engineering. His career began with the General Electric Company at Schenectady as a sales engineer, and later he became assistant manager at the Detroit office of that company.

In 1924, Mr. Dean joined The Detroit Edison Company in the electrical engineering department. In 1927 he was made senior electrical engineer; in 1930 he became chief assistant superintendent of the electrical system; and in 1943 he was named chief engineer of the system.

Mr. Dean had been president of The Engineering Society of Detroit and past-chairman of its Civic Affairs Committee. He was also a member of the Board of Commissioners of the Detroit Street Railways, and of the Rapid Transit Commission; a director of the Citizens' Housing and Planning Council of Detroit; a fellow of the AIEE; and a member of the ASME.

Mr. Dean had long been active on committees of the EEI and the NELA, and at the time of his death he was a member of the Engineering Division General Committee.

Protecting the Taxpayer

By Hon. C. Emory Glander

Tax Commissioner of Ohio and President of the National Association of Tax Administrators

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 2, 1949

AT the outset I wish to commend your industry for its demonstration of faith in the future of our country. I have noted the statement of your President, Mr. Acker, that you installed more generating capacity last year than in any other previous year. That achievement, midst the uncertainties and difficulties of these troublous times, is a tribute to the initiative and daring of private enterprise. May your faith inspire others.

A year or two ago, *Life Magazine* published an interesting story in pictures showing how, for 4000 years, taxes have vexed the world. There depicted were Egyptian, Assyrian and Persian taxpayers bearing tribute in kind to their rulers. There also were Rome's Publicans, profiteering tax concessionaires; Queen Boadicea, one of the earliest rebels against taxation without representation; and King John and King Charles I, who taxed so heavily that one lost his prerogative and the other his head.

American incidents likewise were included. There were illustrations of the Stamp Act Repeal, the Boston Tea Party and the Whiskey Rebellion. In case you may have forgotten, the Whiskey Rebellion was neither a sobriety movement nor a revulsion against bad liquor. Our forefathers simply thought that a whiskey tax of 7 cents to 18 cents a gallon was too much.

The Growing Burden of Taxation

I thought of those historical incidents recently while reading the Report of the Advisory Committee on Internal Revenue Taxation. It said: "There is too great an emphasis on 'protecting the revenue,' too little on protecting the taxpayer . . . The key to a fuller utilization of the taxpayer's cooperation lies in the adoption of Government policies and practices which will lead to a greater degree of mutual confidence."

Those words both raise and answer a grave national question, and I make them my text today.

In the old Roman calendar, the 15th day of March was known as the ides of March. You will recall Shakespeare's "Julius Caesar" in which the soothsayer warns Caesar, saying: "Beware the ides of March." Plutarch's Lives tells the inside story. It says "that a soothsayer bade him (Caesar) prepare for some great danger on the ides of March. When that day was come, Caesar, as he went to the Senate, met this soothsayer and said to him by way of raillery, 'The ides of March are come;' who answered him calmly, 'Yes, they are come, but they are not past.'" And you will remember the tragedy that befell Caesar. He fell at the hands of his friends, even Brutus. He was the victim of a terrible danger, which, though very near to him, he would not see or believe.

MR. GLANDER

An American Tragedy

It is my conviction that an equally great danger besets the American people now. It is ever-present, like the perfidy of Caesar's friends. But, like Caesar, we do not see or believe.

A recent newspaper editorial pointed out that citizens of 25 states voted last November on proposals involving state bond issues, higher state taxes, or increases in state spending. It summarized the results as follows: Of 16 proposed bond issues, 12 were approved. Of 19 proposals for increased spending, 13 were approved. But of 19 proposed tax increases, 12 were defeated. "In other words," the editorial concluded, "most of the voters in the 25 states liked the idea of more governmental spending. And their enthusiasm for such spending mounted with the degree to which they believed they, themselves, would escape or postpone paying the cost."

I would state it more emphatically. Too many people have the delusive impression that governments can indulge in an everlasting orgy of spending at the expense of persons other than those directly benefited. Our nation is suffering from a chronic attack of the "gimmes," and it is high time that we face the facts! We need to pray, as Thomas Huxley did when he summed up the scientific creed in a single sentence: "God give me strength to face a fact though it slay me."

What Is A Billion Dollars?

The facts which I ask you to face are calculated in the billions. I wonder how many of us can really comprehend a billion dollars. I read somewhere that if you had started at the beginning of the Christian era to spend a billion dollars at the rate of $1000 a day, and had kept it up continuously, your total expenditures to January, 1949, would amount to about 711 million dollars. To reach the billion-dollar total at this rate, you would have to go on spending $1000 a day for another 791 years, or until A.D. 2739. That is how much one billion dollars is. Yet, in 1947, the total tax in the United States, federal, state and local, was almost 52½ billion dollars!

Look back with me for a moment across the vista of the last three decades. It is 1917 and the national economy is geared to the first World War. Yet the total tax burden in the United States is but 3½ billion dollars. Let 10 years pass. It is 1927, and our nation is on the threshold of that other era of infla-

tion when everyone thought the millenium had dawned. Even then, the cost of all government in this country was but slightly over 9 billion dollars. Now move ahead another decade and it is 1937. We are in the terrible thirties when our government was "shooting the works" in pump-priming projects of many sorts. Even then our annual tax burden had moved up to only 12½ billion dollars. Of course, we are putting much of the cost "on the cuff" through deficit financing, but nevertheless the contrast with the present is startling. From 3 to 9 to 12 to 52 billion dollars in the annual tax take—that is an increase of 1500 per cent in the short span of 30 years!

Tax and National Income Ratio

But, you may say, is not this a matter of relativity? After all, we have experienced a tremendous increase in the national income in these latter years. Yes, that is true, but have you compared the trend in taxation with the trend in national income? If you will make such a comparison you will discover the fact — which I most want to impress upon you today—that the tax burden has been increasing more rapidly than the national income.

Taxes in the United States now consume about 30 per cent of our total national income. This means that our people work about 15 weeks out of 52 for government. Federal taxes alone last year were about 2 billion dollars more than the total national income just fifteen years ago. The truth of the matter is that the percentage of all taxes to national income has more than doubled in the last 20 years. This trend, sooner or later, will take its tragic toll of our American standard of living.

Moreover, let us not be deceived by our increased national income as stated in today's dollars. If you relate that income to the pre-war dollar you will encounter a surprising fact. You will find that ever since 1945 there has been an actual decline both in our "real" incomes and in our "real" savings. Indeed, our real savings have fallen more rapidly of the two. If the government continues to take each year in taxes more and more of our dwindling earnings, there will be less and less available for investment to maintain and expand our economy. The hope for a free America is an ever-expanding economy based upon private enterprise. But this nation cannot nourish an expanding economy if our wellspring of national savings is pumped dry by government.

There is another interesting fact that I would have you notice. The burden of taxation in these last 20 years has shifted from state and local taxes to federal taxes. In fact, the state and local burden in recent years was relatively lighter than it was two decades ago, while the converse is true of federal taxes.

The state and local tax picture, however, is rapidly changing. State expenditures in 1947 were up 35 per cent over war-time levels. In the same year, state debt, reversing a 6-year downward trend, increased about one-fourth. While state reserves were still mounting, the rate of increase had sharply diminished. New taxes were imposed in almost two dozen states since January, 1947, while tax rates were increased in an equal number. In California, which levies a state sales tax, local sales taxes were levied in 123 municipalities. In my own state of Ohio, which has had no new or increased state taxes since the middle of the depression, local income taxes have been levied by almost a half dozen of our larger cities. And so the trend goes.

But the fact of greatest significance in the whole picture is the mortgage which our generation has placed upon the future earnings of ourselves and our children. The federal debt has reached the astronomical figure of 252 billion dollars—a quarter of a trillion dollars! State and local debt constitute another 15 billion dollars. This adds up to $1770 per capita as compared with a mere $12 per capita thirty-five years ago.

Here then is the danger which confronts our nation—that, oblivious to the consequences, we shall spend, tax and borrow ourselves into financial slavery. I say to you that the time has come to cut governmental budgets, to pay governmental debts and thereby to pave the way for ultimate tax reduction —that is, if we really do love our children or have any concern for the generations yet unborn. After all, it is our debt, not theirs. It is ours to liquidate if we have the moral stamina for self-sacrifice which it sternly requires.

Approaches to Budget and Tax Reform

At this point, you may remind me that this nation is engaged in a gigantic and costly effort to build world peace and security. With that I shall agree. You may also ask me what particular governmental expenditures should be cut. I shall quickly tell you that I do not know.

It is precisely because I do not know that I can suggest at least two desperately needed reforms in governmental finance. One is the need for budgeting and accounting procedures that will clearly show the people what spending programs are contemplated, what they will cost, and how wisely the money has been spent.

Hoover Commission Proposal

I have been scanning the Reports of the Commission on Organization of the Executive Branch of the Government, of which Mr. Herbert Hoover is Chairman and Mr. Dean Acheson is Vice Chairman. The reading of those reports ought to be a "must" for every public official and every adult citizen in this country.

In the report on budgeting and accounting, the Commission proposes a plan which would tell Congress and the public two things: "1. On Budgeting: What is the money wanted for? 2. On Accounting: What do the taxpayers get for it?" In other words, the Commission recommends "that the whole budgetary concept of the Federal Government should be refashioned by the adoption of a budget based upon functions, activities, and projects." It calls such a document a "performance budget."

Accounting Reform for Local Governments

I am convinced that there is need for a similar reform in every state, county and city in the United States. Two years ago, I made a study of the tax and revenue system of the State of Ohio and its political subdivisions for the Governor and General Assembly of my state. The purpose of the study was to suggest ways and means of aiding local governments. The key to the problem was an index of local needs. But that index was exceedingly elusive simply because of the lack of adequate budgeting and accounting procedures on the part of local governments.

I think that business-like budgeting and accounting, from the federal government on down, would expose startling information. I believe it would reveal countless cesspools of waste and extravagance that always develop in governmental units that, having no controls, tax and spend the tax.

I have already alluded to our huge national debt. Perhaps you have wondered how it can ever be paid. A recent book, entitled "Our National Debt—Its History and Meaning Today," suggests what ought to be an obvious answer. It says that "the Number One task of debt reduction is to control the over-all total of government spending." I wish to add that governments not only must spend less but also that government spending should not be used to win political support at elections.

Budget and accounting reforms, however, are not enough. Governmental tax structures themselves have become terribly confused and overlapping.

Grants-In-Aid

The federal government is now taking such a large slice out of the total tax dollar that the tax resources of the states and their local governments are being severely restricted. As a consequence, state and local governments have come to look more and more to Washington for grants-in-aid. The growth of these grants is amazing. From a mere 5 million dollars in 1915, they have mushroomed to well over 1 billion dollars in 1947. In other words, federal grants have increased 200 times in 32 years, and now aggregate 32 dollars for each family of four in this country.

Does it seem strange to you that in a period of the largest per family income in our history, our people are standing like vagrants before the National Treasury? Or can it be that we are witnessing here at home the creeping paralysis of totalitarianism, either of the right or of the left?

The situation in our states is little better. In 1947, the states paid more than 2½ billion dollars in aid to local governments. That was almost 75 dollars for each family of four, and represented exactly one-third of total state revenues excluding unemployment compensation taxes.

These facts explain why our federal-state-local taxing system has come to look like a crazy-quilt. It explains why we have what the Hoover Commission has called the "problem of duplicating and triplicating taxation." The time has come to tackle this problem in dead earnest. This will require that top officials of our federal, state and local governments inaugurate a continuing plan of joint study and action.

Fortunately, the Secretary of the Treasury called a conference of federal, state and local officials in Washington last month to discuss intergovernmental problems in taxation and related matters. I attended that conference and I believe that it can mark the beginning of a new era of enlightened federalism. In addition, the Congress now has before it several bills to establish a National Commission on Intergovernmental Relations. The purpose of such a commission would be to study ways and means of eliminating duplication and overlapping services and establishing a more orderly fiscal relationship among the several levels of government. I strongly urge that legislation to establish such a commission be enacted at once.

In solving our intergovernmental tax problems, I am committed to no specific plan. But I do have some convictions as to principles. I would not confine state and local governments to exclusive reliance on their own tax resources. That would doom certain areas of our land to substandard existence or poverty while other areas live in relative luxury. At the same time, I am opposed to the unbridled extension of governmental subsidies or grants-in-aid. That policy will ultimately destroy local financial independence upon which the integrity and strength of state and local governments are closely dependent.

We should have centralization of taxation with subsidies or grants-in-aid where necessary. At the same time, every possible effort should be made, as the Hoover Commission recommended, "to leave to the localities and the states adequate resources from which to raise revenue to meet the duties and responsibilities of local and state governments. Thus we shall maintain strong local self-government, which is the fountainhead of democracy and our republican form of government in America."

Easing the Tax Burden Through Sound Tax Administration

Finally, I wish to speak directly to the taxpayer. You may have an academic interest in tax structures, but what you most want is substantial tax reduction. Suppose, however, that is not possible now or, being possible, is not accomplished. Can anything else be done for you? I think it can within the field of tax administration.

The one thing that you as taxpayers dislike more than paying taxes is a tax administration that favors some of you and prejudices others. It is in the area of administrative enforcement, however, that we are most tragically deficient in achieving consistency and impartiality of treatment among taxpayers.

There are persons of naive temperament who believe that tax enforcement is not particularly necessary in a nation with high moral standards such as we believe ours to possess. That is a dangerous misreading of our society and our times. Selfishness and greed are as rampant as ever. Without adequate enforcement of tax laws, substantial segments of our population escape their responsibility to organized society; and that is where tax equality becomes a myth.

Enforcement of Tax Laws

I know of only two effective ways in which to cope with this situation. First, there is no substitute for field examinations and audits. There is need, however, for better coordination of audit activities. Federal and state agencies, which now exchange information, should try to develop joint audit procedures. These would make possible the maximum utilization of enforcement personnel and also minimize duplication of effort which results in annoyance to taxpayers. We need to remember that the cost of administering a revenue system which Adam Smith emphasized in his fourth maxim of taxation involves not only the outlay by government but also the expense, in time and money, which the taxpayer must meet in complying with the requirements set up by the tax administrator.

The second, and even more needed enforcement program, consists of compliance techniques which will assure the filing of returns and the payment of taxes by all persons liable therefor. Too often tax administrators have been guilty of auditing the same taxpayers year after year without even inquiring whether others are escaping taxation entirely.

There can be no justification whatever for a situation in which one taxpayer is required to pay his taxes while his tax-dodging competitor is permitted to escape his share of the burden. The great majority of people pay taxes honestly and on time. It is highly desirable that we protect their interests as

(*Continued on page* 287)

Economic Trends and Their Possible Effects on The Future

By George B. Roberts
Vice President, The National City Bank of New York

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 2, 1949

ECONOMIC trends, more specifically, *long-term* economic trends, are at the same time both more risky and less risky to talk about than short-term trends. Long-term trends are more risky because there is more chance to be wrong. It is difficult enough to predict only six months or a year ahead, let alone trying to predict what is going to happen ten years hence. On the other hand, long-range predictions may be safer, because by the time the future arrives no one will remember the predictions anyway.

Yet despite all the hazards of trying to guess the future, business does have to make long-range plans. This is particularly true of the utilities which must always keep a jump ahead of the population's needs. And just so long as business has to do long-range planning it will need to know about trends.

Growth of Population

Let us start, then, by considering population growth. While, strictly speaking, this is not an economic trend, it has such important economic effects that we shall include it on our list.

MR. ROBERTS

You may recall the dire predictions some 10 or 15 years ago of a falling birth-rate in this country and declining rate of population growth which contributed so much to the "mature economy" philosophy of the 30's.

Well, what actually happened? In answering this question I should like to present certain basic material from a most interesting address on "Long-Term Trends in Industry" by Donald Woodward, Vice President of the Mutual Life Insurance Company, before the New York Society of Security Analysts.

Fig. 1 shows the steep increase in recent years in the number of marriages to the highest in American history. While the peak was in 1946, the figure for 1948 was still at a high level.

This high rate of marriages is the result mainly of deferments during the war and during the depression of the 30's. While the rate seems likely to fall further in the years immediately ahead, there is, in the natural course of events, almost certain to be a correspondingly large number of marriages in another 20 to 25 years, again in 40 to 45 years from now, still again 60 to 70 years off, and so on over a long period.

Rising Birth Rate

One of the not surprising consequences of this high rate of marriages has been an unprecedented activity on the part of the stork, as revealed by Fig. 2, showing the number of babies born.

Besides the high rate of marriages, the

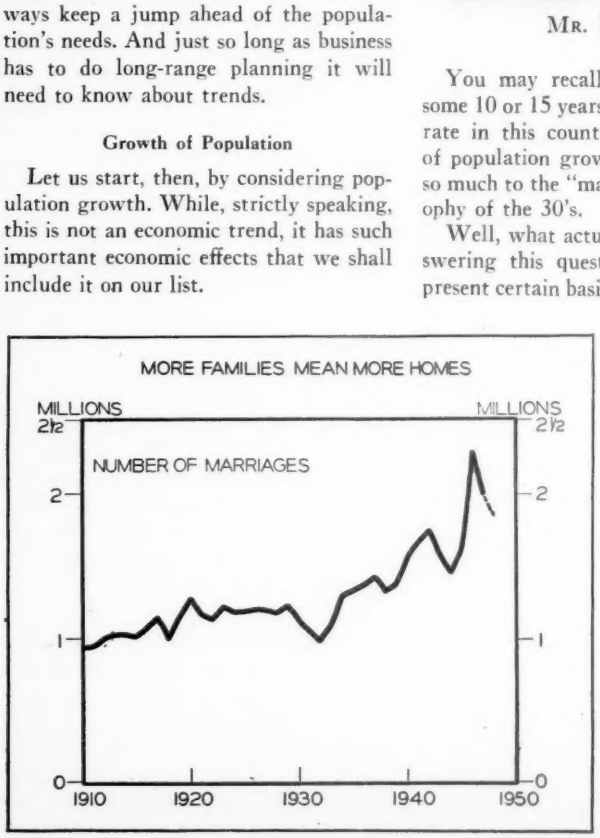


Fig. 1—U. S. Population Growth, 1910-1948

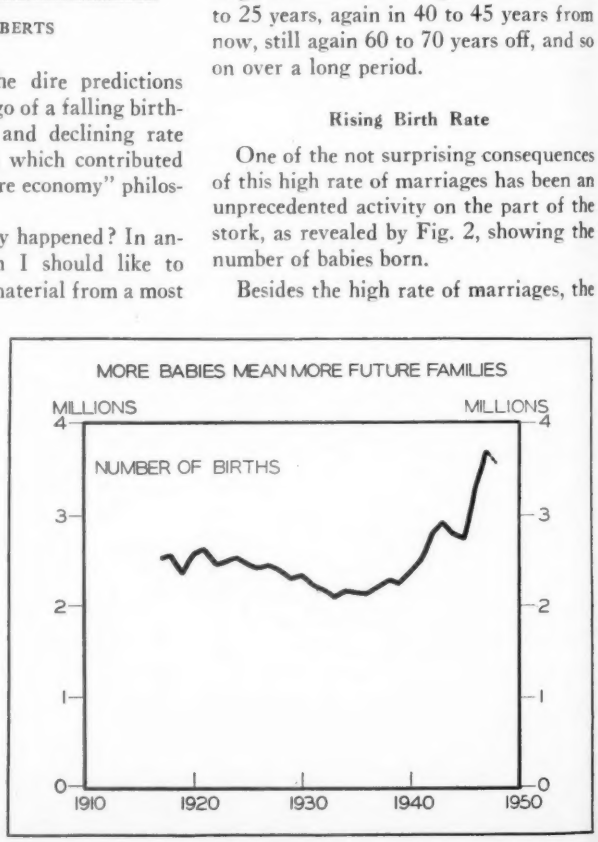


Fig. 2—U. S. Birth Rate, 1917-1948

Fig. 3—Average Hourly Earnings in U. S., 1820-1948

Fig. 4—Manufacturing Hourly Earnings Compared to Cost of Electric Power to Large Commercial User, 1910-1948

high birth rate probably reflects two things: first, a deferment of children during the war and the preceding depression; and, second, the high level of family incomes recently prevailing.

Whether the rate of births will remain high, I do not venture to predict. The population experts are skeptical—though it may be noted that they were too pessimistic before and did not anticipate the present development. This much, however, seems fairly certain—the big crop of babies now means another big crop some 20 years hence, another some 40 years hence, and so on as in the case of the marriage rate.

What these facts seem to suggest is that the population projection curves have been shaped too low, influenced possibly by the experience during the 30's, and that actually population growth is destined to exert its buoyant influence more intensely and over a longer period than has been entering into recent calculations.

This, I think, is one of the first points to be noted in connection with economic trends.

Rising Wage Costs

We turn next to another major long-term trend which has shown unusual persistence. As Fig. 3 shows, the wages of labor have tended steadily upward over a long period of years. There have been setbacks at times, but they have never wiped out the preceding gains, and soon the rise was resumed to still higher levels.

This advancing trend of wages, accompanied by reduction in working hours and general improvement in working conditions, is one of the amazing phenomena of economic history. It has been made possible only by the continuous introduction of more and better machinery and mechanical power.

Today, after the great rise in labor costs which has taken place as result of the war and of the increased economic and political strength of the labor unions, the incentive for the use of labor-saving equipment is greater than ever.

Labor-Saving Equipment

The next four charts, comparing the cost of human labor with costs of various kinds of labor-saving equipment over a period of years, will emphasize this point. And here again we turn to Mr. Woodward's paper for illustrative material.

Fig. 4 shows the trend since 1910 of average hourly wages paid to labor in the manufacturing industries, compared with the cost of electric power to a large commercial user. It shows the extraordinary cheapness of a kilowatthour of electrical energy compared with a manhour of human energy.

Fig. 5 shows the cost of farm labor over a long period of years compared with prices of farm equipment, as computed by the Department of Agriculture. It indicates what a great bargain farm equipment has become relative to farm labor.

Next, Fig. 6 shows the cost of a maid for the home as compared with the cost of a sewing machine, as illustrative of household labor-saving devices.

Finally, the next and last of the four charts, Fig. 7, dealing with comparative costs shows the cost of office labor as indicated by a typist, compared with an average of four types of office equipment —an adding machine, a typewriter, a letter file cabinet, and an office safe.

One of the great difficulties about comparisons of this kind is in making allowance for constant improvement in quality of labor-saving equipment. Were it possible to do this, I am satisfied that the story told by these charts would be even more impressive. The fact is that conditions have never been so propitious, indeed more compelling—for the substitution of mechanical labor for human labor in the factory, on the farm, in the office, and in the home. And all this means more and more use of electric power.

There may, of course, be times of temporary check to this rising curve of power demand, coinciding with cyclical downturns in general business. Possibly we are approaching such a period now. But over the long run the stimulus normally associated with a healthy increase in population, with all its manifold wants, together with the powerful and still more significant drive towards mechanization in every field, gives promise of continuing the growth which has been an outstanding characteristic of the electric power industry. Like Ol' Man River, "it jes keeps rollin' along."

Interest Rates

There are, of course, other major long-term trends that enter importantly into business calculations. Two of these are interest rates and commodity prices. Now obviously anyone talking about trends in these fields enters upon slippery ground. Nevertheless, certain tentative suggestions may be put forth.

Fig. 8 traces the course of interest

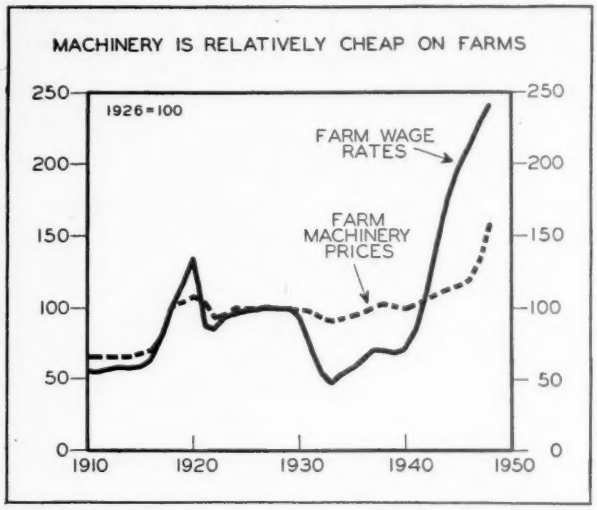


Fig. 5—Farm Wage Rates Compared to Farm Machinery Prices, 1910-1948

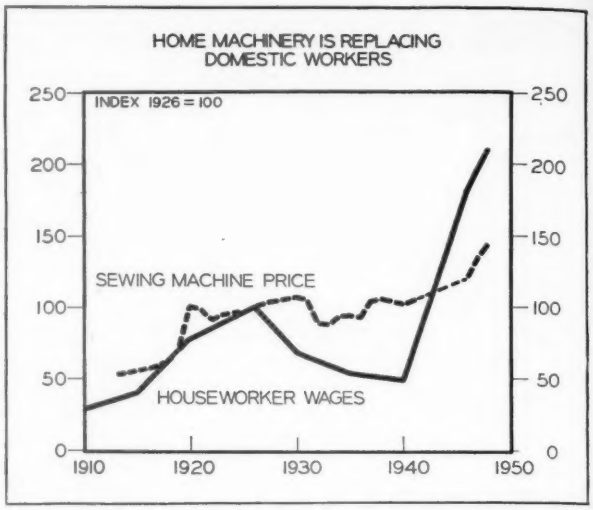


Fig. 6—Houseworker Wages Compared to Sewing Machine Price, 1910-1948

rates, as represented by short-term commercial paper and long-term railroad bond yields over the past 100 years.

This chart brings out the abnormally low levels to which interest rates, both long- and short-term, fell during the 30's and 40's. This was due, first, to huge gold imports and sluggish demand for capital during the 30's, and later, during the war, to the cheap-money policy adopted for floating the war loans.

Postwar Interest Rates

After the war, interest rates, though permitted some slight upward adjustment, have continued to be held relatively low by the Government's policy of supporting Treasury bond prices and preventing an increase in the interest cost of the national debt. Not only were interest rates kept from exercising their natural role in keeping money demand and supply in balance but the process itself of pegging markets involved inflationary additions to the money supply at the very time when inflationary pressures in the economy at large were already a serious problem.

In short, by making stability of interest rates and bond yields the primary objective of credit policy, the monetary authorities found themselves forced into actions that tended to accentuate instability in business, and increased the risk of boom and bust.

Looking ahead, we can, I think, take it for granted that the Government, with its huge responsibility for managing the national debt, will want to continue control over interest rates. But such control may come to be exercised less rigidly. As time goes on, we should get further away from the idea of a fixed pattern and level of rates, and move instead towards a more flexible policy that will allow wider latitude for the natural economic forces to be reflected in the interest rate and to the Federal Reserve for influencing money and credit volume.

Commodity Prices

The course of commodity prices in the country since 1770 is traced in Fig. 9. It shows that each of our great wars pro-

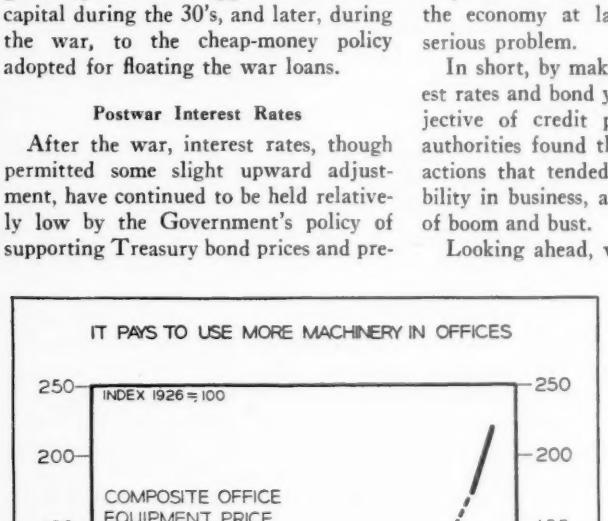


Fig. 7—Typist Salary Compared to Composite Office Equipment Price, 1910-1948

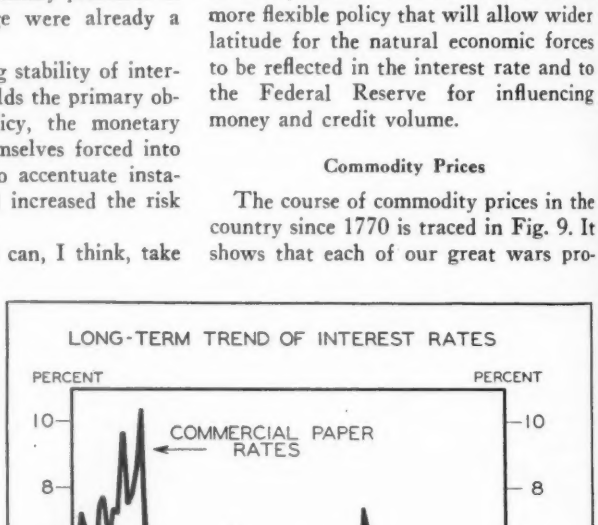


Fig. 8—Interest Rate Trends in Short-Term Commercial Paper and Long-Term Railroad Bond Yields, 1910-1948

Fig. 9—U. S. Wholesale Commodity Prices, 1770-1948

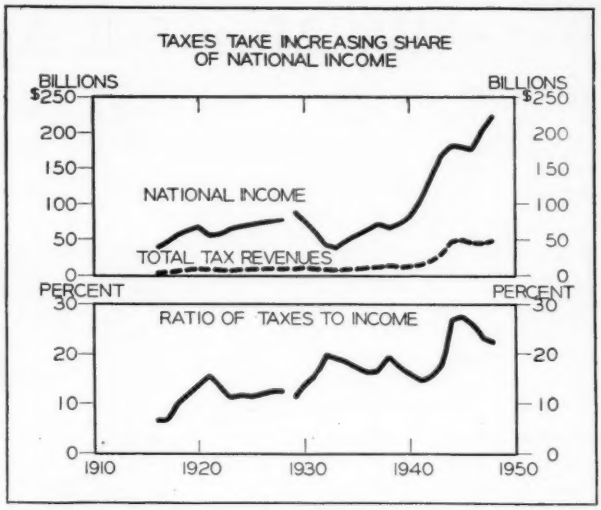


Fig. 10—National Income Compared to Total Tax Revenues, (Below) Ratio of Taxes to Income, 1916-1948

duced a great inflation of prices, and that in the past each of these great inflations was followed by a great deflation. World War II was no exception as to inflation, and already prices have turned down from the peak in a manner uncomfortably suggestive of previous postwar deflations. The question is, where are we heading?

Prices and Wages

Any positive answer as to where prices are going I leave to those who are more venturesome in forecasting than I. However, looking over the record of 1920, it is interesting to note that prices, after the precipitous decline that wiped out about two-thirds of the wartime rise, reached a plateau of stability at around 50 per cent above prewar which held until the collapse starting in 1929.

Today there are factors in the situation, not present in 1920 (at least to the same degree) which may cushion the decline in prices and prevent it from going as far as it did then. In the first place the great increase in the money supply during World War II, which played so large a part in making the boom, was based largely on government rather than private borrowing from the banks. Since government debt is not likely to be reduced rapidly, and may increase, there will not be the same drain on current purchasing power to pay off private bank loans as in the past periods of liquidation.

Secondly, the strength and determination of organized labor to transfer an increasing proportion of the gains from technological progress into higher wages tends to keep prices up.

Thirdly, we have government props under agricultural prices. Finally, we cannot overlook the possibility of inflationary government action through pump-priming or so-called "compensatory spending" being introduced at an earlier stage than before.

All these factors of wage policy, government price supports, and government spending exert—by their effect on costs or in dilution of the money supply, a long-range bias towards higher prices. Of course a bias of this kind works only intermittently, and there are forces operating in the other direction—notably the technological progress in agriculture and industry which is working always to increase output and to reduce costs and prices. We need only remind ourselves of what has happened in recent years with hybrid corn, rubber, aluminum, synthetic textiles—to cite only a few examples.

Inflationary Forces Slackening

One thing at least seems clear—that the inflationary forces created by World War II have for the time being run their course. Today the country's economy, measured in dollars, has very largely caught up with the wartime increase in the money supply, wartime shortages of goods have been reduced, and the country's productive capacity vastly increased.

For a regulated industry such as the utilities, this means a particularly welcome relief from the worst problems of rising costs. There should now be more opportunity for technology and for the traditionally laggard rate adjustments to catch up. That the utilities have come through the inflation so well is not only a reflection of America's great need for power, but a tribute to technical and managerial efficiency of which the industry may well be proud.

Rising Cost of Government

Fig. 10 depicts a major long-term trend which threatens grave consequences to our economy and way of life. This is the rising cost of government.

The upper half of the chart shows, over a period of some 30 years, the trend of national income and of the total tax load, both federal and local. The lower half shows how the ratio of taxes to national income has increased over the years.

In 1948, 22 per cent—more than one dollar out of every five—of the national income was taken in taxes. While the ratio has declined from the wartime peak, this, as you see, was due not primarily to reduction of taxes, but to the inflation of incomes during the postwar boom. As the national income falls with the petering out of the boom, this ratio is bound to rise and become more burdensome.

Nor is any end in sight to this trend of rising government costs. Despite the huge national debt and the heavy cost of national defense and foreign aid, the pressures upon Congress for more spending for public works, subsidies, bonuses, guarantees, and "free" services of all kinds is terrific. The Administration evinces little interest in economy, but on the contrary leads the spending parade and asks for more and more taxes. Meantime, the national income is receding.

The insidious thing about all this

(*Continued on page* 288)

We Must Sell Aggressively Today

By Edwin Vennard

Vice President, Middle West Service Company

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 2, 1949

IN A broad sense, a properly designed sales promotion program should not be based upon gross kilowatthour sales, nor gross operating revenue, nor even net revenue. It should be based upon the over-all index of electrical utility operation; namely, per-cent return on total investment. Naturally, such a sales promotion should be coordinated with all other activities.

It will be my purpose to consider such a coordinated sales program under three headings:

I Need for Such a Program.
II General Outline of Program.
III Should We Start Now?

I—NEED FOR SUCH A PROGRAM

Let us first review the principal elements entering into electric utility operation and then let us project these elements through 1951.

Capacity and Load

Fig. 1 shows the industry installed generating capacity and the sum of non-coincident peak loads for the period 1912 through 1948.* Projections are then made as follows:

MR. VENNARD

A. The generating capacity projection is based upon the actual and planned purchases of generating equipment without allowance for retirements.

B. This projection of the load is based upon the 1944-48 trend. If this trend prevails, the industry reserve capacity will be 10.7 per cent of the installed capacity at the close of 1951.

C. This projection of the load is based upon the 1935-48 trend. For this trend to prevail, there must be a leveling off in business conditions. Based on this trend, the industry reserve capacity will be 21.1 per cent of installed capacity at the close of 1951.

It is probable that the load will be somewhere between *B* and *C*.

Revenue and Per-Cent Return

Fig. 2 shows the investment; gross op-

* The basic data for this paper were furnished by the Edison Electric Institute. The projections were made by the writer.

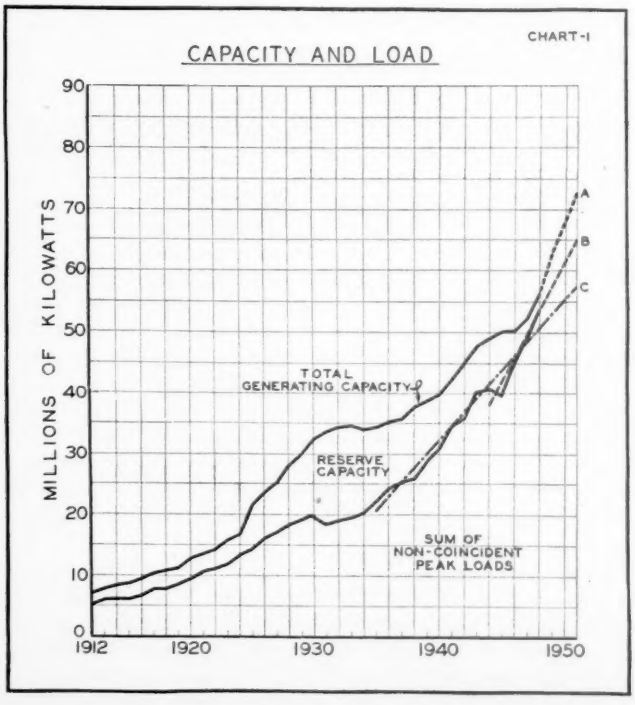


Fig. 1—Electric Utility Generating Capacity and Non-Coincident Peak Load—1912-1948

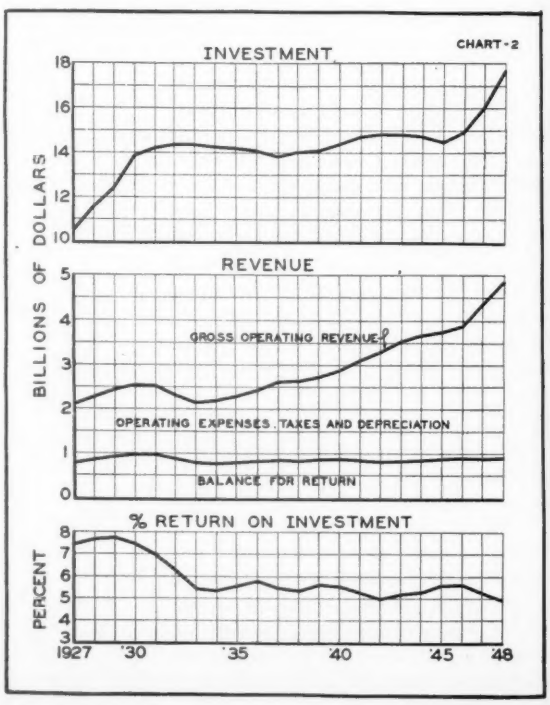


Fig. 2—Electric Utility Investment, Revenue, and Per Cent Return on Investment—1927-1948

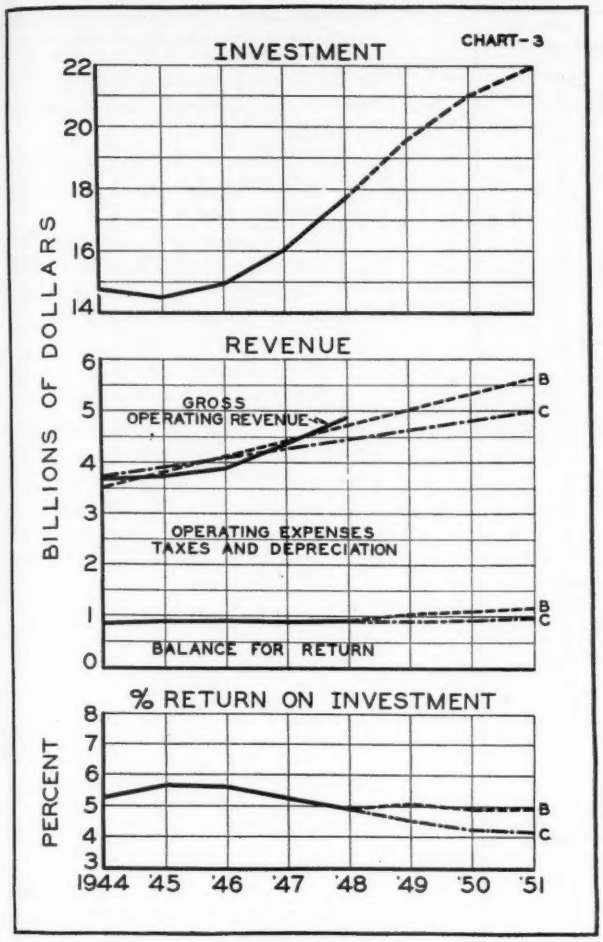


Fig. 3—Same as Fig. 2, Beginning in 1944, and Projected Through 1951

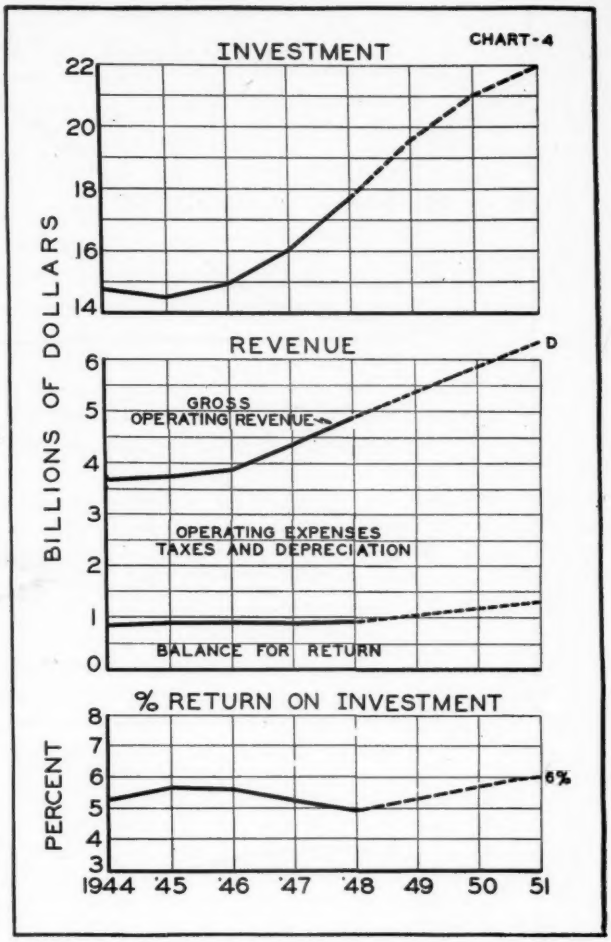


Fig. 4—Same as Fig. 3, Showing Increased Per-Cent Return With Increasing Gross Revenue and an Average Operating Ratio

erating revenue; operating expenses, taxes and depreciation; balance for return; and per-cent return on investment for the electric utility industry for the years 1927 through 1948.

Fig. 3 is the same as Fig. 2 (beginning in the year 1944) with the projections through 1951 made as follows:

Investment:

Projection *A*, the investment, represents the commitments for new equipment by years through 1951, with anticipated retirements and write-offs.

Gross Operating Revenue:

Projection *B* is based upon the 1944-48 trend.

Projection *C* is based upon the 1935-48 trend.

Balance for Return:

This was calculated from the following assumptions:

1. The operating ratio in 1951 will be equal to the average for the years 1946-7-8. This assumption is made despite the fact that the operating ratio (operating expenses and taxes divided by gross operating revenue) has increased steadily from 54 per cent in 1931 to 74.3 per cent in 1948. A leveling-off by 1951 is assumed for the following reasons:
   (a) The wholesale commodity price index probably has turned the corner.
   (b) New, more efficient generation will replace high-priced generation.
   (c) Since the trend must change, management will probably find a way.

   (The combination of *a*, *b* and *c* could easily cause a decrease in operating ratio.)
2. Depreciation is assumed to be the same per cent on investment in 1951 as in 1948.

Per-Cent Return on Investment:

Per-cent return on investment is obtained by dividing the balance for return by the total investment.

Based on this study, it would appear that the industry per-cent return would be somewhere between *B* and *C* on Fig. 3 if trends were allowed to take their normal course. However, this study also indicates that positive efforts should, and probably will be, made and specific programs prepared to increase the per-cent return on investment.

Good utility management has always found a way to meet and solve its problems. There is every reason to believe that the industry will take the necessary steps to increase its per-cent return.

Yes, there is a need for a program of this kind.

II—GENERAL OUTLINE OF PROGRAM

First, let us determine what the industry needs to do to increase its return to say 6 per cent. Then we shall endeavor to make a few suggestions for individual company programs.

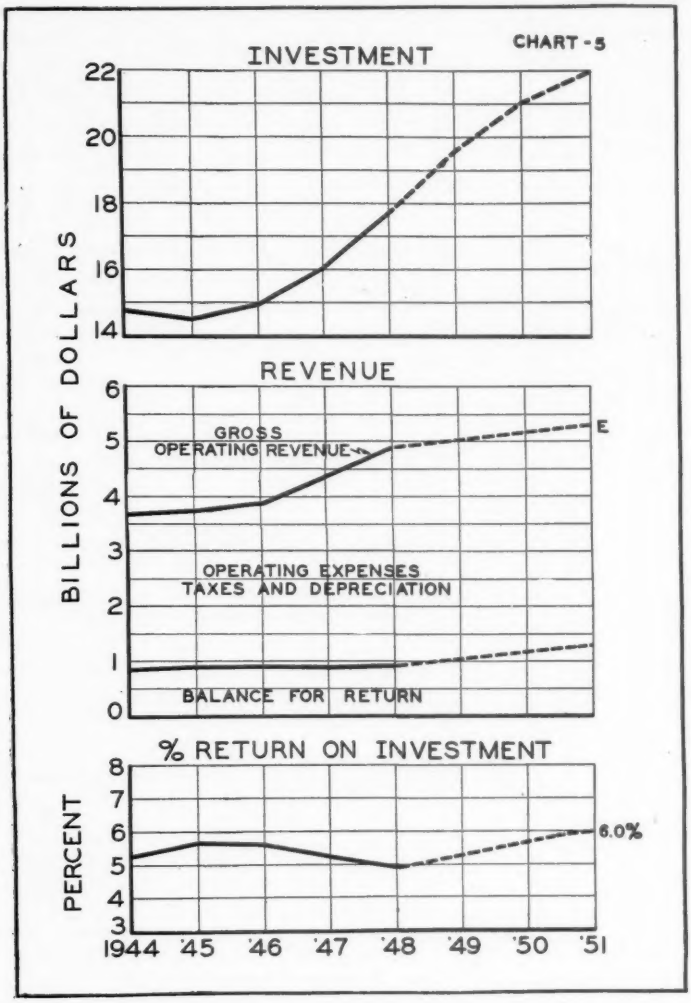


Fig. 5—Same as Fig. 3 Showing Increased Per-Cent Return With Increasing Gross Revenue and Decreasing Operating Ratio

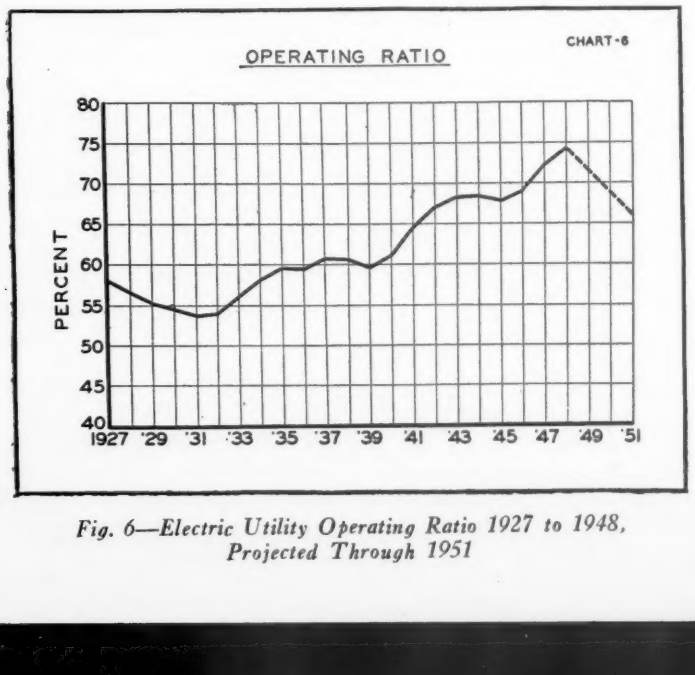


Fig. 6—Electric Utility Operating Ratio 1927 to 1948, Projected Through 1951

A—Increased Per Cent Return Accomplished by Increasing Gross Revenue with no Improvement in Operating Ratio.

Fig. 4 was prepared as follows:

1. Project per-cent return to 6 per cent.
2. Calculate the Balance for Return by multiplying this 6 per cent by the investment.
3. Assume depreciation to be the same per cent on investment as in 1948.
4. Assume that the operating ratio remains as the 1946-7-8 average, which is 71.9 per cent.
5. With this operating ratio calculate the gross operating revenue.

It is noted from the chart that the required gross operating revenue on this basis is 6.3 billion dollars at point *D*. This is greater than the gross operating revenue projected to point *B* on Fig. 3, which projection was made on the basis of the 1944-48 trend.

It does not appear likely that the gross operating revenue can be pressed to this high point.

B—Increased Per Cent Return by a Combination of Increased Gross Operating Revenue and Decrease in Operating Ratio.

Fig. 5 was prepared as follows:

1. Project per-cent return to 6 per cent.
2. Calculate the Balance for Return by multiplying this 6 per cent by the investment.
3. Project the gross operating revenue to point *E* which is halfway between point *B* and point *C* projections on Fig. 3. This places the revenue somewhere between the 1944-48 trend and the 1935-48 trend.
4. Assume depreciation to be the same per cent on investment as in 1948.
5. Assume taxes to be the same per cent of gross revenue as the average for 1946-7-8.
6. Calculate the operating ratio resulting from these assumptions.

Under these assumptions, the operating ratio at the close of 1951 would have to be 65.8 per cent.

Fig. 6 shows the operating ratio for the years 1927 through 1948, actual and projected to 1951, under these assumptions.

It would seem reasonably possible to achieve this goal of gross operating revenue and operating ratio in order to reach the 6 per cent objective.

However, this will require a positive effort and program.

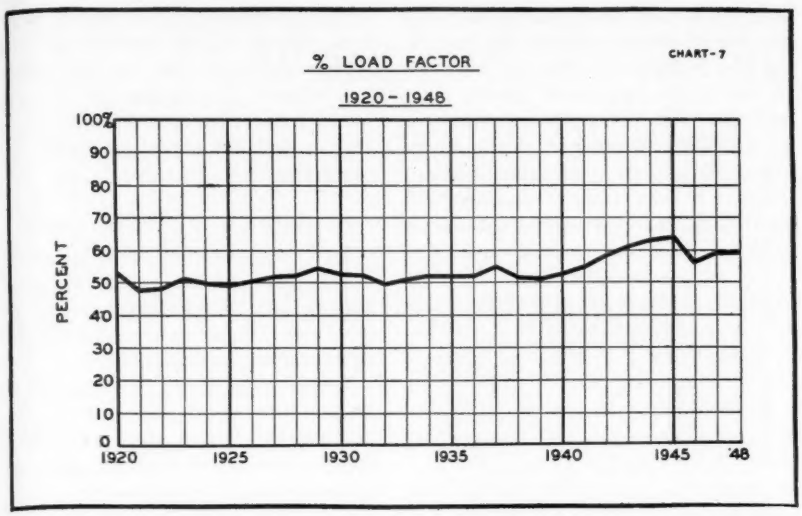


Fig. 7—Electric Utility Industry Load Factor in Per Cent, 1920-1948

Company Suggestions

Following are a few suggestions that may assist a company in preparing a program of this kind:

1. Project all of the company's economic elements to 1951, based on present trends.
2. Project the per-cent return to the desired percentage of say 6 or 6½ per cent. Then project all of the other factors based upon the company's over-all program. All departments of the company will play some part in preparing a program of this kind. Here are a few specific suggestions.

Sales

The sales department should prepare a complete sales program by years, broken down by classes of service and by individual appliances. The whole program should be designed to improve load factor, net revenue and per-cent return.

Diversified Industry

The industrial development department should specialize in attracting diversified industry.

Load Characteristics

When per-cent return is declining with an increase in gross operating revenue, it means we are not receiving sufficient money for the increased sales. The fault may lie in the character of the new business or may lie in the rate schedule. To determine the fault and make necessary corrections, we need to know more about the load characteristics of the various types of new business. More companies should engage in these studies which form the basis of good rate making.

Cost Analyses

Under present-day conditions, we need to be more scientific in our rate design so that we can be assured that an adequate increase in per-cent return results from the sales effort. Thus we need more cost analyses to determine the earnings by rate schedules and especially to determine the per-cent return that we realize from the bottom steps in our rates. These analyses naturally have their limitations. But they are a necessary guide to good management and a primary requisite in a program designed to increase per cent return.

Rates

Where rates are faulty, steps should be taken to make necessary corrections. Special consideration should be given to:

1. Bottom steps of all rates.
2. Rates to residential customers having a high demand and low load factor. Most residential block rates are designed to cover residential customers within a fairly narrow range. For large residential users above say 5 kilowatts, residential rates should be equipped with a demand feature.

Off-Peak Rates

Consideration should be given to the specific design of off-peak power rates applicable to those industries that can profitably operate during off-peak hours. Such off-peak provisions should be rigidly enforced whether or not the company has excess reserve capacity.

Load Factor

Most of these suggestions can be summarized in the one suggestion that the program be designed to improve load factor. The possibilities are great.

Fig. 7 shows the electric industry load factor from 1920 through 1948. An improvement in load factor from 60 to 69 per cent will enable a typical company to increase its present 4.93 per-cent return to 6 per cent—by these routes alone. (See Fig. 8.)

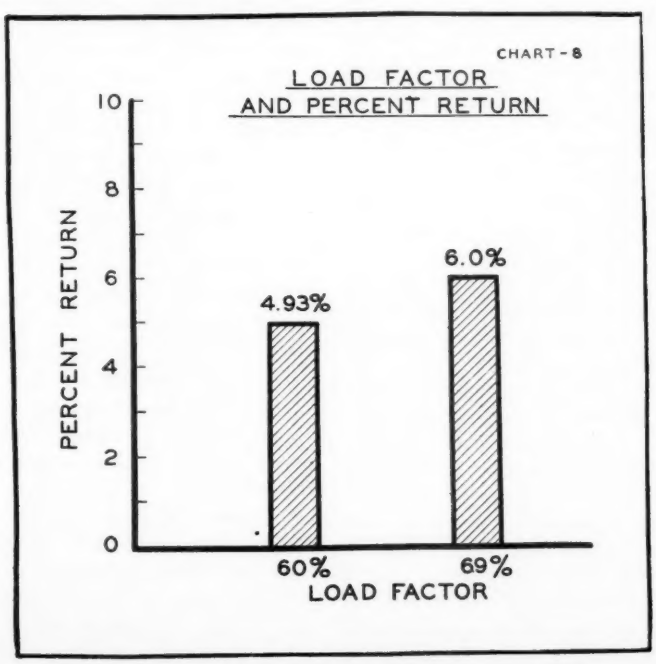


Fig. 8—Electric Utility Load Factor and Per-Cent Return

Hold Down Capacity Reserve

During the 30's, plant capacity reserves reached a 40 per cent high. Present rates cannot carry such excess. Much has been learned in the art of pooling—keeping reserves to a minimum. This pooling should be a specific part of the program of increasing per-cent return.

Sales Operating Ratio

A sales accounting procedure should be established which will show the ratio of sales expense to the gross dollar increase produced by sales effort. This sales operating ratio is as important to the efficient operation of the sales department as is the over-all operating ratio of the company in determining the efficiency of the company's operations.

Power Pool Investment

The work-order procedure should be designed so that there is shown not only the new investment to serve the particular new business but also the allocated portion of the power-pool (power plant and transmission) investment. Thus the work order will show total investment chargeable to the particular business. The net revenue from the business will then be related to the total investment so that management can be assured there is satisfactory per-cent return on total investment. Also, the procedure makes all key employees conscious of the importance of the power-pool investment.

Sell the Organization

Finally, the program of improving per-cent return should be properly presented to all key employees. All will play some part in its success. Progress reports should be issued from time to time with emphasis not on gross kilowatt-hour sales, nor gross revenue, nor even net revenue, but upon per-cent return.

Obviously a program of this kind would have to be adjusted about once a year. Such adjustment, however, does not detract from its value.

III—SHOULD WE START NOW?

If we are to consider a sales program in this broad sense, it appears reasonable that we should be engaging in such a program now. If we are not, plans should be started as soon as practical.

It takes from six to twelve months to prepare such a program, to have it understood by the key employees, and to employ and train the necessary additional people.

Yes, it appears we should start now.

The Lawyer's New Tasks in Rate Proceedings

(Continued from page 256)

gency increase. There was one dissent. One Commissioner could not understand why his colleagues thought that the market price of the stock would go up some 20 points without more earnings. Unless that order is set aside, the company and its consumers can only hope for the best when the opinion is put to the test of the actual market.

In another state (Maryland), a large company has just been allowed a temporary rate increase of about 11½ per cent upon testimony that there had been a material increase in the cost of capital since the last prior order in 1946, and that the company's actual rate of return had fallen below the rate found reasonable in 1946. That opinion stressed the extent to which the public is dependent upon the company for electric service and the fact that the capital therefor must and can only come from the investing public and can only be attracted by an adequate return.

Any departure from the most direct possible appraisal of current market requirements for a particular company, is fraught with danger. The commission in this State (New Jersey) is now being asked to approve a deviation from a rate adjustment plan which attempted to establish a basic rate of return by adjusting to the capital requirements of one company the earnings-price ratios of selected barometer stocks taken over a three-year period. Experience has shown such a divergence from the rate so established that the return allowed is attacked as inadequate and unsound. It is pointed out that the free interplay of economic forces has produced test ratios based on market prices in excess of book values and that, under the plan, those ratios are then applied to book values and thus the return is less than what is necessary to support the market values which would attract required new capital at favorable cost rates.

A collateral point to be watched in finding an over-all rate of return is the inclusion in surplus of equity capital when weighting the costs of bond and stock money. If surplus is left out in computing the average, as sometimes is done, the effect is equivalent to a cut in the rate base.

These cases demonstrate that the issue of rate of return is a question of fact, not theory. Utilities must compete for their money and they must be allowed to earn enough to be successful in getting the investor's dollars on good terms in relation to the rest of the market.

The men who make their living in the investment market, as sellers or buyers or expert economists or advisers, would seem to be best qualified to give the testimony on which findings of fact about it can be based. Their views have some influence on the market and their opinions about the market reception of a proposed security, within the range of normal preparation for issue, are the next best thing to the actual results of an offering.

The market appraisal of a utility's securities reflects the composite judgment of the public at large, evaluating all the factors affecting the position and prospects of that utility. If that public judgment indicates a need for more earnings to bring a utility stock up to a little over par, or to bring it in line with the stocks of other companies with which it would otherwise seem to be fairly comparable, then it behooves all parties to the rate case to accept that judgment as a test of the soundness of any rate base being advocated and of the fairness of any previously established or preconceived rate of return.

If public opinion in the market place dissents from the decision of a rate case, it is likely that there has been some error in the decision which, I submit, the United States Supreme Court would admit. That court may view a rate order in its entirety and measured by its end results, but it must not be forgotten that in the Colorado Interstate Gas Company case the same court said "That is not a standard so vague and devoid of meaning as to render judicial review a perfunctory process. It is a standard of finance resting on stubborn facts."

If you adhere faithfully to that standard you will, I am confident, come through your struggles with flying colors.

What Are We Selling For?

By D. C. McKee

President and General Manager, The Empire District Electric Company

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 2, 1949

MY experience in the electric business has been varied and not limited entirely to selling. My experience has been obtained with a comparatively small company serving relatively smaller communities and rural areas.

I know the men with companies in large metropolitan areas have problems different from those of smaller operating companies. But, due to my association with a smaller company, I have perhaps been in a position to live through the years somewhat closer to Main Street and the people we serve, and may be able to judge what our customers expect of us and think about us as an industry. Instead of trying to advise our industry how it should sell, I propose to comment upon underlying problems and philosophies of our business which should be considered in our thinking about sales policies.

Maintain Flow of Capital

At the outset, I want it clearly understood that I recognize our companies must keep themselves in a sound economic position both as to earnings and as to capital structure to be of continuing service. We should do everything possible which will maintain the flow of capital to our business, and attract the investing public to it. What I say is in full recognition of these fundamentals, and adherence to the principles I suggest should strengthen and maintain our financial security.

The theme of this commercial program is very timely. The normal progress of our industry has been distorted, particularly the selling and promotional activities of our companies, because of the war. A look backward over the history of our industry discloses many different cycles or eras in our efforts and activities. An attempt to look forward seems to suggest further changes.

Just as the development of the United States witnessed the final disappearance of the western frontier, the development of the electric industry now witnesses the disappearance of its geographic

MR. MCKEE

frontier. In place of the problems of acquisition, integration and expansion, there now emerges another cycle or era with new problems. If I were to generally characterize the era ahead of us, I would call it the era of more complete utilization.

Full Utilization of Services

Within the near future, through the cooperative efforts of rural electrification distributing cooperatives and our companies, all of the rural areas, as well as the centers they surround, will be served. Then our objective will be to develop and promote full utilization of our services, and to provide these services at the lowest possible cost consistent with sound business principles.

No Fixed Sales Approach

A sales approach to accomplish the objective will have to be determined. In our business, there are many views regarding character and scope of sales activities. This is entirely natural because there is no fixed pattern, which can be followed by all companies.

Sales policies and programs must vary with each individual company, and depend, among other things, upon the character of the territory served, economic conditions prevailing at the time, existing loads and physical facilities, and earning situations. Therefore, there is always the question for an individual company of when to sell, what to sell, and how to sell.

The management of each company must direct its selling policy and program as a musician plays a pipe organ. There are times when it is necessary to pull out all of the stops in order to obtain maximum volume, and there are times when the soft pedal should be applied; and by the proper tone control, it is possible to obtain the harmony desired. In sales policies and programs, there are times when the loading conditions of plant facilities warrant strenuous efforts to obtain certain industrial loads, which will quickly give increased volume. There are other times when the types of business, which improve load factors, are needed.

Approaching Another Era

During the war, we experienced a time when, for reasons beyond our control, it was necessary to soft pedal promotional activities which might bring on loads detrimental to the war effort.

As we approach the threshold of another era and every company is giving consideration to a sales program, it is timely that we stop and ask ourselves, "What are we selling for—What is our purpose or objective in selling?" However varied might be the views of companies on sales efforts and programs, the answer to this question is vital to all of us.

In order to perceive the implications of the inquiry, it is helpful to look back to the earlier days of our industry, and to inquire why our business was created and review what responsibilities we assumed.

In the beginning, electricity was a great mystery. In some people it created fear. Some people thought the claims for its possible use were just crackpot ideas. Some looked upon its development solely as a chance to make money. Others with vision realized that this great new force would revolutionize

our way of living and develop our industrial strength.

As our engineers developed the techniques of generation, transmission and use of electricity, the foundation of a great national industry was built. Investors were attracted to our industry and provided the money for its expansion as a free enterprise, and in a relatively short time, the great benefits of our electrical service were being carried to more and more people.

Uneconomic Duplication

Economic difficulties arose with the invasion of a particular field by more than one company, and the benefits of service to customers were imperiled by these difficulties. Municipalities and states soon generally recognized that advantages could be obtained for their citizens under governmental regulation, and one of these advantages was the elimination of the uneconomic element of duplication. Under certificates of convenience and necessity granted by state authorities or by municipal franchises, definite territories and service obligations were assigned to the respective companies. The particular company accepting such a certificate or franchise assumed the duty and responsibility to extend the benefits of electric service to the people in the assigned area, for any purpose for which service was found to be useful. This elimination of duplication of facilities was found to be in the public interest.

Then, what justified the existence of our companies as sole distributors of electricity in their respective areas? Our companies were not created solely for the purpose of providing an opportunity for investment. They were not created merely to provide employment.

The companies and their manner of functioning under the regulated system were created as a result of the discovery of a new force, which was destined to alleviate the burden of mankind. Under this system and through the efforts of our industry, our product has done more to revolutionize our way of living, and to make our nation strong, than possibly any other single factor.

It is true that, under the system of free enterprise, we have made possible the sound investment of the savings of people, and have provided the opportunity for the initiative and efforts of thousands of men and women, but our industry could not have grown and will not continue to grow if it had not in the past, and does not in the future fulfill its obligations and keep before it a broad objective—a social objective.

What is this objective? It is to make sure that this great force of electricity does accomplish the greatest social and economic good to all our people.

We recognize that, even though the duplication of facilities is economically unsound and disadvantageous to our consumers, yet we are entitled to the exclusive rights and assigned territory under governmental authority only so long as we excel in meeting the responsibilities imposed upon us. It is the responsibility of our engineering and operating forces to make sure that adequate and dependable service is produced and delivered at the lowest possible cost, but it is the responsibility of the sales forces to obtain complete utilization of our service, and to accomplish the broader social objective.

Social Obligations

Our sales organizations must see that our service is utilized to the economic and social advantage of everyone. Advantageous uses of electrical appliances should be taught in every home. Commercial institutions should be told how our service can aid in the marketing and distribution of their wares. Industry should be shown how our great service can improve the quality of manufactured products and reduce the cost of production. All of our people should know that the service and resources of the electrical industry are dedicated to community, farm and industrial development. All of our people should know of our worthy achievements of the past and that they can be maintained or surpassed in the future only by us.

In general, these are the responsibilities of our industry. To discharge them is why we are selling. To meet our responsibilities is our duty as the sole purveyor of electric service in our area.

In accomplishing our great social obligation under the free enterprise system, it is necessary to use the savings of the people we serve and apply the "know-how" of our trained organizations. Our success requires the proper stewardship of funds invested in our business.

I believe the investing public and persons engaged in attracting funds to our industry must be better informed as to our obligation. They should realize that the security of their investment will depend upon the company's ability to extend its service, to build for the future to keep ahead of public needs, and to pioneer continually in the field of utilization of our service, and fulfill our social objective.

In order to fulfill our obligation, we also must attract to our business the best brains and talent, and the most public-spirited and loyal people it is possible to find. To do this, we must adequately reward them for their efforts.

What Are We Selling For?

I ask again, "What are we selling for?" Are we selling just to make our companies bigger? Bigness is only justified if it results in greater economy or greater service. Are we selling just to make a profit on merchandise? If that is the case, we should go into the merchandise business without engaging in the power business. Are we selling just to build up a large sales personnel? If so, our sales executives are missing the spirit of their obligations.

I have avoided blueprinting a definite pattern of specific sales effort. I shall present a gauge by which any sales plan should be tested as meeting our social objective: Will our sales efforts increase the comfort or convenience of our customers? Will our sales efforts increase production or reduce costs for the users of our service? Will our sales efforts increase the employment and purchasing power of our people? Will our sales efforts contribute to the health and safety of the public? Will our sales efforts contribute to the improvement and the economic welfare of the community we serve? Will our sales efforts bring credit to our company and a recognition by its customers that we are more than fulfilling the obligations we assumed by acceptance of a grant of the exclusive privilege of service?

Services Not Measured By Meters

The field of selling is not limited. We sell electricity, yes, but we are selling services that are not measured by our meters, and which mean as much, in many instances, to the satisfaction of our customers as does the quality of our service. Our industrial engineers can become indispensable to our industry. Our lighting, heating and other experts can be of limitless value to industry, to business, and to the homes. Our home service and appliance sales and service organizations are indispensable in carrying the benefits of our service into the home.

I realize that there are many methods of doing this, either through direct merchandising or through dealers, or by a dealer cooperation plan doing both, but the efforts of our industry are vital in this field. Great opportunities exist in the field of agriculture, not only in the utilization of our service, but through participation in programs for the improvement of soil and farm practices. The industrial development activities of the community need the leadership and the resources that we have at our command. There are many other fields of opportunity in selling, all necessary to fulfill our responsibilities and social objective.

We should aggressively publicize our activities and our services, and tell the story of the accomplishments of our business. But, it is by performance of our duties, by the attainment of results, by doing the job as well as talking about it, that we will earn the confidence of the public and their approbation of our efforts.

Conflict in Philosophies

Why have I stated over and over again the number of our responsibilities and the broad scope of our sales obligations? For this reason. In this country today, there has developed a great conflict in the thinking of our people, a conflict of philosophy, a conflict of principles as to the relation of government to industry. In this conflict, our industry has been singled out for attack. You may or may not agree with me that this attack is a calculated scheme to entice the public into some form of socialism or statism.

There are many deliberate efforts to bring statism about, but I believe that the vast majority of those who advocate a change from our established American principles are unaware of the ultimate end of the path down which they are being led. They must realize that government ownership of the electric power business is one of the first steps toward socialism. They must recognize that the electric power industry has been the key industry to be socialized in other countries where this philosophy of statism has triumphed over free enterprise.

You know that, in general, the attacks on our industry are unwarranted. No industry has contributed more to the welfare of mankind in such a short period of time than has our own. No industry has better kept faith with the people it serves, and recognized and fulfilled its obligations in a more dynamic and efficient manner. This has all been accomplished without the aid of a paternalistic government.

The people should be made aware of the advantages they have derived from our industry as an investor-owned, government-regulated, taxpaying industry dedicated to the public service. They should be made aware that we deserve every encouragement from all branches of government—municipal, state and federal—instead of being singled out as a target for governmental competition and socialization.

Our government and the people should be reminded that the sound, investor-owned electric industry, without government subsidy, provided the power for American industry to meet the demands of war. In the words of the Chairman of the War Production Board, "Power has never been too little, never too late!" If we are to maintain a strong electric industry to protect our national defense, we should not be weakened by threats of government subsidized competition.

False Prophets

I have a firm faith and belief that the people of this country will ultimately recognize that the voices calling for the destruction of our industry are those of false prophets. There is still a general belief in the fundamental principles of private enterprise, which made this country great, and by means of which it is the country in the world receiving the highest blessings of electric service.

We are not going to still these voices of socialism or stop the trend towards socialism or statism, and preserve our electric industry merely through wishful thinking. It will be through our efforts alone that we succeed. That is why I say it is time to stop and ask ourselves, "What are we selling for?" You and I know that our industry has done a magnificent job. We are confident that, in the era ahead, our industry will continue to measure up.

Dynamic Sales Organization

I believe that efforts to socialize our business, as a step in the process of socialization of all business, will fail. But I also say to you that this will happen only if our companies, those serving in metropolitan areas as well as those in the most remote rural areas, maintain dynamic sales organizations, instructed and empowered to promote broad social objectives which will lead as rapidly as possible to the complete utilization of our service for the benefit of our people.

The opportunity is ours. The duty is ours. The avenues are open to us. What we must do is to provide enlightened, aggressive sales leadership, which will convince the public that our interests are their interests, and that their best interests are common with ours. Our actions must continually inspire and warrant the public to oppose inroads on our industry, which will pave the way for their own ultimate socialization.

A new selling slogan has been adopted to inspire the public—"Of course—it's electric." I think this is fine.

But I believe another slogan may be needed to inspire ourselves. If so, here it is: "Where there is a need—Take the lead."

With this realization of our obligations and responsibilities and opportunities—Stop and think—What are we selling for?

C. A. Leland

(*Continued from page* 252)

returned after service in France as an artillery captain in World War I. His next association was with the Kansas Power & Light Co. at Topeka, as construction engineer, becoming in 1926 vice president and general manager of the organization. For a time in 1927 he managed both the Kansas and the Iowa companies. He was president of the Kansas Power & Light Co. from 1931 to 1933, in addition to his Des Moines duties.

When Mr. Leland went to Des Moines in 1927, the Iowa Power & Light and affiliated organizations were delivering 108 million kwhr of electricity annually. Last year the company marketed 571 million kwhr. The average demand for electricity in 1927 was about 35,000 kw; today it is nearly four times that figure, or about 125,000 kw. In the 22 years since Mr. Leland assumed direction of Iowa Power & Light, its farm power lineage has increased from 304 miles of line to more than 5300 miles; and electric customers have increased from 44,600 to 128,000.

Mr. Leland was a director of the United Light & Railways Co. and its subsidiary, the Continental Gas & Electric Co., Chicago, Ill., holding companies of Iowa Power & Light.

He was also a member of the American Institute of Electrical Engineers.

The Sale We Must Not Lose

By Merrill E. Skinner

Vice President, Union Electric Company of Missouri

An address before the Seventeenth Annual Convention of the EEI, Atlantic City, N. J., June 22, 1949

WHILE every salesman expects to lose a sale once in a while, he is occasionally confronted with a situation where his whole future depends upon the outcome of a single negotiation. Today, the electric utility industry faces such a crisis. We are negotiating a sale we dare not lose, or we are out of business—out of a job. That sale, of course, is to the people of the United States. It involves their acceptance of business management for utility operation.

You have heard a lot about it at this Convention, both on the program, in the corridors, and in your discussions with fellow delegates. It is THE problem of the industry, transcending all others. If we lose this sale we can forget the rest of the problems because they will become the responsibility of someone else—presumably some agency of Government.

A Tough Selling Job

We are in the position of the missionary trying to sell the cannibals on the idea that he can do them more good by helping with mind and spirit than by satisfying their appetite. It is a selling job and a tough one.

So, it seems appropriate, as we wind up this closing session of our Convention, to leave with this problem uppermost in our minds. My purpose is to again remind you of its importance, to urge the use of sound sales psychology in dealing with it, and to suggest sources of potent assistance, of which you may or many not be taking advantage in your company. I will suggest five questions which I believe we should be asking ourselves as we return to our desks.

In the usual sales situation, the salesman is trying to persuade the prospect to try something new. He trades on every weakness and dissatisfaction with the present, and stimulates his prospect's mind with word pictures and demonstrations of the benefits to be enjoyed from the product or service he offers.

He is the aggressor, and most of us have been on the receiving end enough to realize the advantage which he enjoys. One of the things that makes this job

MR. SKINNER

so tough is that we are on the defensive. We are trying to keep the prospect satisfied with what he has, trying to persuade him that the benefits he presently enjoys are such that he is not warranted in the risk that is inherent in trying something new—trying to persuade him against the promises made by the proponents of the competing system of operation.

The basic principles of sales psychology are relatively simple. Many of you know that the Edison Electric Institute has provided an excellent basic sales training course which can be presented in 15 to 16 hours of classroom instruction. The entire text of this course can be read in about an hour. Reading the text or even taking the course does not make a salesman—but it will remind those who have occasion to use sales psychology in their work of the right and the wrong ways of going about their job.

Increasing Sales Effectiveness

For those who instinctively use the proper sales approach, it will rationalize and explain why some of your techniques work better than others. For others to whom the instinctive sales approach does not come so easily, it will provide valuable suggestions to aid you in better handling your share of this industry sales job. So, I ask Question No. 1—"Have you taken full advantage in your company of this valuable tool?"

In asking that question I suggest you think beyond the limited number of people in your organization who are classified as sales people, engaged in expanding the use of electricity among your customers—and consider the possibility of increasing the sales effectiveness of your entire organization in meeting this No. 1 industry problem, by giving them at least a nodding acquaintance with proper selling methods. Your own Sales Department should be able to put together an acceptable short course in Basic Sales Psychology.

Basic Sales Principles

What are some of these basic sales principles? One of them emphasizes the importance of providing the salesman with a thorough knowledge of the product, particularly what it will do for people. And, so, the first lesson for sales groups is to analyze the product. What does it do? What are the advantages of its performance? Consciously or unconsciously, the prospect always asks "What benefits will *I* enjoy if I buy this?"

Being equipped with this answer as a prelude to actual contact with the prospect, you must then gain his attention. The time-honored formula is to learn as much as you can of your prospect's state of mind; to create a friendly atmosphere; to secure his attention by outlining and demonstrating the benefits he will enjoy by adopting your suggestion, and by creating in his mind dissatisfaction with substitute methods. That means we should look old "status quo" squarely in the eye—analyze every advantage it offers, and busy ourselves eliminating any disadvantage that such an analysis discloses. And remember, it must be the advantage to the other fellow, not to you.

Question No. 2 might be "How thoroughly and intelligently have you classified and organized the advantages to the public of business-managed utility operation and the disadvantages of other methods?"

Speaking before the annual meeting

of the Missouri Association of Public Utilities recently, Mr. J. W. McAfee, President of our Company, pointed out some of the weaknesses in the opposition's arguments as follows, and I quote:

"People have been conditioned to the acceptance of misleading clichés and phrases so that many have ceased to analyze them.

"For example: let us take the phrase 'public ownership.' What other kind of ownership can there be in this country? The public owns and must support all of the subdivisions and agencies of Government. The only question of ownership is: Shall it be voluntary or involuntary? Will we continue to put some premium on the industry and frugality of the individual and allow those who accumulate savings to choose for themselves what investments they will make, or will we, by the use of the taxing power, force the individual to be an involuntary investor in business?

"One more phrase," Mr. McAfee said, "is worthy of examination. It has a very appealing sound—'cheap power.' Is a thing made 'cheap' by concealing its cost with subsidy, by freeing it of the cost of supporting the normal functions of Government, and by allocating large parts of its cost to other objectives such as flood control, irrigation, etc.?

"Electric power can be produced only by converting one form of energy into another. This is done by machines of various kinds. These machines must be run and managed by men and women. Their function is in no way affected by the type of ownership.

"The real question is: Under what system can the men and women involved work most efficiently? Is the best result produced by the Government or by a private business organization?"

More of that type of searching analysis and appraisal of the arguments used by the opposition is needed.

Satisfied Customers

Satisfied customers are certainly a basic essential in meeting the attack we face. We cannot expect to stay in business very long under the political climate applicable to our industry today unless we can meet that test conclusively. It is well to remember that giving good service at low rates may discharge our obligation as a service industry but such action of itself falls far short of any contribution to the problem under discussion.

Customers may discover the benefits of our service eventually—but dare we wait? Their satisfaction with what they buy from us and their attitude toward us can be enhanced — their favorable opinion arrived at more quickly, if we remind them of the benefits which they enjoy from the service we now supply them and for any additional service we can persuade them to purchase. Here is the advantage we gain if we sell our service instead of letting the customer buy it.

Every well handled sales transaction makes friends. Price is not everything, and there is real satisfaction in a purchase where the benefits to be enjoyed have been ably and enthusiastically made clear to us by the salesman. It also establishes the basis for a friendly regard which will last for years if it is cultivated and not adversely affected by subsequent carelessness.

I would hazard a guess that everyone counts some salesman among his personal friends, one who has sold you well, earned your respect, and won your friendship. So Question No. 3 might well be: "Are we using our contacts with our customers to convert them into satisfied customers quickly?"

"Something For Nothing"

But, that is not enough. Even if we are blessed with the most contented customers in the world, we can still lose this most important sale. In the same address from which I quoted previously, Mr. McAfee in commenting on the postwar performance of the utility industry, and measuring it against the objectives set for business by the Administration, said, and I quote:

"No other industry met the test so well as the utility companies . . .

"How, then, can you explain the acquiescence of the public in the onslaught of those who seek to substitute political management for business management in the utility field? There can be but one answer—the great avalanche of propaganda built largely around the fraudulent principle of 'something for nothing', which has been so insistently pressed on the public consciousness."

Time was when the limits of an individual municipality bounded any municipal ownership problem—but not any more. The arena of conflict in ideology has enlarged until it takes in the entire country, with the principal factors which determine the eventual outcome of the contest being settled in the halls of Congress in Washington.

Our competition makes its headquarters in Washington and its grand strategy is concocted there in the deeply entrenched bureaucracies of the Federal Government. Here is where they measure our stewardship, develop their sales arguments and their sales strategy.

To win our case, the most difficult obstacles to be overcome are elements of the Federal Power Policy, such as the cunningly devised "preference clauses." Through such quirks of law, the Federal bounty is extended to some of our citizenry while it is withheld from others, even though they make the same contribution through taxes. How can salesmanship help in such a situation? Let's examine that question for a moment.

Buying Motives

A recognition of the buying motives which activate prospects is another basic principle of selling. There are many ways of describing these motives which all add up to about the same thing. I like the classification used in the EEI Basic Sales Training Course:

Profit and Economy
Comfort or Convenience
Health and Safety
Pride and Prestige

Effective selling arguments can all be classed as appealing to one or more of these buying motives, and different people may buy the same thing for entirely different reasons. The dominant buying motive must be sought and discovered in each instance. That being the case, it might be well to review the arguments we are using to see which ones are likely to be most effective.

We can help ourselves too if we can discover which arguments are most convincing with different segments of the public. An argument which appeals to the man on the street in your own home town may fall perfectly flat when presented to the Congressman representing some other state, so it would seem to be in order for us to ask Question No. 4: "What are the dominant buying motives which will be most effective in persuading each segment of the public to our point of view?" Having determined them, we should use the best arguments we can muster that will appeal to such motives.

There is nothing for which we need apologize in the kind of selling I have been talking about. Today, the salesman's stock in trade are the *facts* which pertain to his product or service. There is never a need to apologize for the presentation of facts. We will not be as efficient as we might be unless we present our facts adroitly and in accordance with the sound principles of successful sales psychology.

Complete candor is vital to good public relations, and we, at Union Electric, feel that it should be the keystone of our press relations. We feel that our ex-

perience during the period, when our margin of reserve capacity all but disappeared, provides powerful arguments in favor of complete frankness.

We, of course, saw the squeeze coming long before anyone else in the community was even aware of such a possibility. We organized a steering committee from among our top executives to develop our course of action and our policy. We first took pains to see that every possible step was taken to protect our customers' interest. We prepared to face operating gambles which would never have been attempted under normal conditions.

Emergency Press Conference

When adverse water conditions at our hydro plants indicated difficulties ahead, our executive vice president called representatives of the Press to his office. He laid all the facts of the situation before the newspaper men telling them:

Why the situation had developed.
What we had done to meet the expected crisis.
What building program we had under way to restore ample reserve, and
How we planned to deal with emergencies if and when they developed.

With members of the steering committee and key staff members present, he invited questions. And there were plenty! No question was side-stepped or dropped until the press representatives were completely satisfied with the answers. This open-door policy has provided the news services with all of the facts as the situation developed and has allowed them to be the judges of what constituted news.

During one emergency, the reporters even set up temporary headquarters in the office of our operating vice president. We think this has proved to be a very sound policy. We know that the essential facts of the situation were presented to the public fairly and probably more skillfully than we could have done if we had been accorded editorial privileges. We can recall no instance where information available to the newspapers was used carelessly or so as to embarrass the Company's efforts to meet the situation.

Another thing every good salesman is trained to do is spelled out in the admonition "Use the User." By calling on customers to whom he has already sold his product or service, he finds what they like about it, rekindles his own and their enthusiasm, and obtains their assistance. People who have found the solution to a personal problem usually like to tell others of their success. In a similar manner, groups who are being assailed by the same challenge are likely to join in a common defense. So I raise Question No. 5: "What can we do to get other groups to realize they may be next?" If they can be convinced that they too may be in danger, they will be much more sympathetic to our problem.

One of our men is a member of a bridge club which includes several doctors. This same group has played at regular intervals for many years. Several times in the past the utility man has been put on the defensive by questions from his doctor friends, indicating a certain sympathy for some piece of Government ownership propaganda which had come to their attention. Recently, he reports a great change in the attitude of these men. Now they display the sympathy and understanding that come to people as they go through some hazardous experience together. The pity is that their own situation had to be threatened before they sensed anything adverse to them in the utility picture.

Socialized Medicine

Former Governor of Wyoming, Leslie A. Miller, who served as Chairman of the natural resources task force of the Hoover Governmental Reorganization Commission, was recently quoted in one of our St. Louis papers as follows:

"The doctors of this country are complaining about socialized medicine. In my judgment, what advocates of socialized medicine want to do isn't one-two-three with what the Reclamation Bureau and the Army Engineers are doing to take this country down to socialism."

Previews in Britain

And there are other groups who should make common cause with us. By keeping a watchful eye on what is happening in Britain, we see a preview of the pattern many would impose on this country. The social planners do not keep their plans a secret, and we might now find some allies in the steel business, since the planners have disclosed how willing they are to proceed boldly and to put Government further and further into business, including the steel business in this country.

We, in the electric industry, have learned the value of cooperation among the various segments of our own industry and it should be easy for us with that experience to extend the scope of that cooperation and enlist the strength of these other groups. In such a coalition, aroused by a realization that a threat to any one member of the group must eventually involve all, we might find the collective strength to turn the tide in our favor. Let's call it a sort of North Atlantic Alliance of the American Idea against Creeping Socialism.

Preston S. Millar

PRESTON S. MILLAR, president of Electrical Testing Laboratories, Inc., died suddenly of a coronary thrombosis at his summer home at Glen Spey, N. Y., on June 17. He was widely known and highly regarded in the electrical industry and in illuminating engineering circles.

Born in Andover, N. J., on March 9, 1880, Mr. Millar began his lifelong career in the testing laboratory business and illuminating engineering in 1897 at the Lamp Testing Bureau of the Association of Edison Illuminating Companies at Harrison, N. J. The Bureau later became the Electrical Testing Laboratories in which Mr. Millar held various positions, becoming president in 1929, and continuing in that office when the corporation was succeeded by Electrical Testing Laboratories, Inc., in 1942.

Mr. Millar was one of the founders of the Illuminating Engineering Society, its president in 1913, and a recipient of the IES Gold Medal in 1945. He also served as president with the U. S. National Committee of the International Commission on Illumination from 1936 to 1948, the American Council of Commercial Laboratories from 1937 to 1939 and of the New York Electrical Society, Inc., in 1943-44. He was a vice president of the National Society for the Prevention of Blindness; a fellow of the American Physical Society, the American Association for the Advancement of Science and the Illuminating Engineering Society; and a member of the AIEE, ASTM, American Optical Society and Association of Consulting Chemists and Chemical Engineers.

Mr. Millar is succeeded as president of Electrical Testing Laboratories, Inc., by F. Malcolm Farmer.

EEI PUBLICATIONS AND SERVICE MATERIAL

(Prices include transportation in U. S. only. Please order by number shown before title. Standing Orders may be placed for a specified number of copies of reports of various committees as issued, to be shipped to one address.)

Payable in United States Currency—Postage Stamps Not Acceptable

Accounting and Statistical

	Members	Non-Members
Conference Proceedings (Bound Volume) 1948	$1.25	$1.50
Conference Proceedings (Ind. Reports) 1948	.15	.25
Conference Proceedings (61 presentations) 1947	.15	.25
Conference Proceedings for years 1937 thru 1946, each volume	2.00	2.50
Looking to the Future in Collections, 1947	.15	.15
Pro Rating of Irregular Billing Periods, 1947	.15	.15
Reflecting Customer Attitude, 1947	.15	.15
Meter Reading, 1947	.15	.15
Value of a Credit and Collection Department, 1947	.15	.15
Accounting Records and Files, 1947	.15	.15
Developments in Office Devices and Gadgets, 1947	1.00	1.00
Wrinkles (Short Cuts, Devices & Gadgets), 1947	.50	.50
Write As You Talk—Customers Like It, 1947 (The above booklets are also part of the complete 1947 Proceedings)	.15	.15
Simulated Federal Income Tax Return, 1947	1.00	1.00
Customer Accounting Practices and Policies, 1946	1.00	1.00
Summary of Definitions Covering Depreciation and Related Terms, 1939	1.00	1.15
Digest of Authoritative Opinions of the Definitions of Original Cost (Including Appendix on "Prudent Investment"), 1938	1.50	1.60
Statistical		
R-2—Electric Light and Power Industry, 1948 (1949)	.30	.75
Q2—Electric Light and Power Industry, 1947 (1948)	.30	.75
P-2—Electric Light and Power Industry 1946 (1947)	.30	.75
O-2—Electric Light and Power Industry 1945 (1946)	.30	.75
M-2—Electric Light and Power Industry, 1944 (1945)	.30	.85
L-2—Electric Light and Power Industry in 1943 (1944)	.30	.75
K-2—Electric Light and Power Industry in 1942 (6/43)	.30	.75
J-2—Electric Light and Power Industry in 1941 (5/42)	.30	.75
I-2—Electric Light and Power Industry in 1940 (5/41)	.30	.75
(Statistical Bulletins also available for years 1932 to 1939 inclusive) each	.30	.75
Weekly, Monthly and Annual Statistics (Includes Annual Statistical Bulletin; Weekly Electric Power output; Monthly Electrical Research Statistics).	2.00	2.00

Engineering Committees

ACCIDENT PREVENTION—RESUSCITATION

P-9—Application and Care of Rubber Protective Equipment, 1948	.25	.25
100-499 copies, 15% discount		
500 or more copies, 25% discount		
O-15—Use and Care of Pole Climbing Equipment, 1946	.25	.25
M-10—Fifteen Messages on Accident Prevention in Electric Utilities	.10	.10
L-4—Linemen Cutouts (2/45)	.10	
K-8—Pole Top Resuscitation (9/43) (Quantity Prices on Application)	.10	
J-9—1941 Accident Statistics of Electric Light & Power Industry (12/42)	.10	.25
F-10—Tree Trimming Practices (10/38)	.20	.50
E-12—Resuscitation Booklets (11/47) 1— 9 copies .15 each; 10— 99 copies .10 each; 100—499 copies .08 each		

ELECTRICAL EQUIPMENT COMMITTEE

M-15—Recommended Safety Practices for Electrical Metermen	Single copies .25; 10 to 49 copies .20; 50 to 99 copies .18; 100 or more copies .15	
M-3—Principles of System Relaying (1945)	.60	1.50
J-8—Utilization Voltage Standardization Recommendations 1942	.20	.50
F-13—Reconditioning Flood Damaged Electrical Equipment (12/38)	.30	.75
F-5—Design of Switchhouses for Generating Stations and Transmission Substations (6/38)	.40	1.00

HYDRAULIC POWER COMMITTEE

D-15—Penstocks (12/35)	1.00	2.50
A-19—Hydraulic Governors (8/33)	.20	.50

JOINT REPORTS

R-6—Preferred Voltage Ratings for A-C Systems & Equipment, EEI—NEMA (1949)	.70	.90
Q-8—Single - Phase Motor Starting Current Rules, EEI-NEMA-AEIC, 1948	.25	.25
Q-4—Guide for Specification on Indoor Metalclad Switchgear, AEIC-EEI-NEMA, 1948	.25	.25
Q-3 — Standards for Distribution Transformers (Fourth Report), EEI-NEMA, 1948	.80	1.00
P-1—Mutual Assistance in General Emergency Situations Affecting both Power & Telephone Service—Report of Joint Subcommittee on Cooperation in Emergencies, EEI and Bell Telephone System	No charge	
O-12—Report of Joint Engineering Committee of Association of American Railroads & EEI on Crossings of Electrical Supply Lines and Facilities of Steam and Electrified Railroads (8/46)	.50	
Quantities of 25 or more	.40	
O-11—Mutual Practices Applying to Installation and Maintenance of Equipment Used in Providing Telephone Service by Power Line Carrier in Rural Areas (For Field Trial)—Report of Joint Committee on Plant Coordination of EEI and Bell Telephone System	No charge	
O-10—Interim Report of EEI-NEMA Joint Committee on Preferred Voltage Ratings for A-C Systems and Equipment (11/46)	.50	.70
O-5 — Standards for Distribution Transformers (Third Report) EEI-NEMA (6/46)	.50	.70
M-12—Joint Pole Practices for Supply and Communication Circuits—EEI-Bell Telephone (1945)	.50	1.25
M-9—New Developments in Office Machines — Joint AGA-EEI Customer Accounting Committee Report	.50	.50
M-5—Principles and Practices for Inductive Coordination, Allocation of Costs and Joint Use of Poles—EEI-Bell Telephone (1945)	No charge	
I-9 — Standards for Distribution Transformers (Second Report—Revised) EEI-NEMA (1945)	.60	.70
L-5—Interim Report of The American Research Committee on Grounding (1/44)	.10	
K-1—Volume 5 of Engineering Reports Nos. 39 to 49 of Joint Subcommittee on Development and Research (1/43)	5.00	10.00
J-8—Utilization Voltage Standardization Recommendations (10/42)	.20	.50
J-6—Wave Shape of Multi-Phase Rectifiers—Engr. Report No. 49—Joint Subcommittee on Development and Research (8/42)	.50	1.25
J-4—Low Frequency Shielding in Telephone Cables—Engineering Report No. 48—Joint Subcommittee on Development and Research (5/42)	.80	2.00
J-1—Positive Disconnection of Distribution Circuits During Faults to Ground—Engineering Report No. 47—Joint Subcommittee on Development and Research (4/42)	.60	1.50
I-9—Standards for Distribution Transformers (Second Report) EEI-NEMA (12/41)	.25	.60
I-8—Susceptiveness of Subscriber Station Sets—Engineering Report No. 46—Joint Subcommittee on Development and Research (12/41)	.60	1.50
I-7—Frequency Weighting for Message Circuit Noise — Engineering Report No. 45—Joint Subcommittee on Development and Research (12/41)	.20	.50
H-12—Neutralizing Transformers — Engineering Report No. 44—Joint Subcommittee on Development and Research (7/41)	.30	.75
H-10—Effects of Bonding Exchange Aerial Telephone Cable Sheaths to Multi-Grounded Power Neutrals—Engineering Report No. 43—Joint Subcommittee on Development and Research (6/41)	.30	.75
H-8—Standard Basic Impulse Instalation Levels — AIEE-EEI-NEMA (1/41)	.05	.05
H-3—Inductive Coordination Aspects of Petersen Coil Grounding—Engr. Report No. 42—Joint Subcommittee on Development and Research (12/40)	.25	.65
H-1—Test Specifications for Household Electric Ranges—EEI-NEMA (5/40)	.20	.50
G-9—Methods of Measuring Radio Noise—EEI-NEMA-RMA (2/40)	.20	.50
F-17—Short - Circuiting Relay Protectors—Engr. Report No. 41—Joint Subcommittee on Development and Research (8/38)	.40	1.00
F-8—Test Specifications Automatic Electric Storage Water Heaters—EEI-NEMA (10/38)	.20	.50
F-2—Inductive Coordination of Rural Power and Telephone Systems—Engr. Report No. 40—Joint Subcommittee on Development and Research (1/38)	.80	2.00

PRIME MOVERS COMMITTEE

R-8—Boiler Auxiliaries, 1948	.30	.75
R-7—Metallurgy and Piping, 1948	.60	1.50
P-10—Boiler Auxiliaries, 1946-1947	.70	1.75
P-8—Turbines, Condensers, and Their Auxiliaries, 1945-1946	1.00	2.50
P-4—Metallurgy and Piping, 1947 (9/47)	.60	1.50
O-13—Boilers and Combustion, 1946	1.00	2.50
M-6—Boiler Auxiliaries, 1944-45	.70	1.75
M-4—Boilers and Combustion, 1944	1.00	2.50
L-3 — Turbines Condensers, Feedwater Heaters, 1943-44	1.00	2.50
K-7 — Turbines, Condensers, Feedwater Heaters, 1942 (9/43)	.25	.65
K-3—Furnace Tube Corrosion (3/43)	.20	.50
K-5—Turbine Operation Data (6/43)	.30	.75
J-7—Boilers and Combustion, 1941 (10/42)	1.20	3.00
I-6—Metallurgy and Piping, 1940 (12/41)	.70	1.75
I-4 — Boiler Auxiliaries, 1940-41 (10/41)	.90	2.00
H-11—Power Station Chemistry, 1940 (7/41)	.40	1.00
H-9—Turbines, Condensers and Associated Equipment (4/41)	.80	2.00
H-7 — Boilers — Combustion, 1940 (3/42)	1.60	4.00
G-10—Boilers, Superheaters, Economizers, Air Heaters & Piping, 1939 (4/40)	.80	2.00
G-7 — Turbines, Condensers and Pumps (1/40)	.70	1.75
G-3—Combustion, 1939 (12/39)	.80	2.00
F-15—Boilers, Superheaters, Economizers, Air Heaters and Piping, 1938 (12/38)	1.00	2.50
F-14 — Turbines, Condensers and Pumps, 1938 (12/38)	.70	1.75
F-12—Combustion, 1938 (11/38)	1.00	2.50

TRANSMISSION AND DISTRIBUTION COMMITTEE

Q-10—Cable Operation Report, 1946	.75	1.75
Q-1—Cable Operation Report, 1945	.75	1.75
O-14—Cable Operation Report, 1944	.60	1.50
M-16—Cable Operation Report, 1943	.50	1.25
M-1—A-C Network Operations, 1941-1943 (1943)	.60	1.65
L-1—Cable Operation—1942 (12/44)	.50	1.25
K-10—Line Clearing Manual, 1944	1-9 copies 35c.	
K-6—Cable Operation — 1941 General (9/43)	.50	1.25
K-4—A-C Network Operations, 1938-1940 (4/43)	.60	1.50
J-5—Ice and Wind Loading Tables for Overhead Line Conductors (Revision of Tables 85 to 96 of the Overhead Systems Reference Book) 1942	1-4 copies 10c.	
J-3—Cable Operation, 1940 (8/42)	.50	1.25

	Members	Non-Members
H-6—Distribution Transformer Load Supervision (3/41)	.60	1.50
H-5—Cable Operations, 1939 (1/41)	.60	1.50
G-5—Cable Operation, 1938 (1/40)	.60	1.50
G-1—A.C. Network Operation, 1936-1937 (8/39)	.80	2.00
F-16—Cable Operation, 1937 (12/38)	.60	1.50
F-10 — Tree Trimming Practices (10/38)	.20	.50
F-9—Conductor Sags and Tension for Rural Lines (10/38)	.40	1.00
F-7—Economical Distribution Transformers Loading and Thermal Performance of Distribution Transformers (8/38)	.40	1.00
F-6—Lightning Proof Transmission Lines (7/38)	.60	1.50
F-3—Distribution Transformer Load Characteristics (4/38)	1.00	2.50
F-1—Treatment and Inspection of Creosoted Pine Poles (2/38)	.30	.75

SUGGESTIONS FOR SPECIFICATIONS

10 to 49 copies, 25% discount
50 or more copies, 50% discount

	Members	Non-Members
MS-1—Suggestions for Specifications for Standard Dial Constants for Alternating Current Watthour Meters (8/40)	.10	.10
MS-2—Suggestions for Specificaitons for Coordinated and Standardized Low Voltage Metering Current Transformers (8/40)	.10	.10
MS-3 — Specifications for Standard Current Transformers for Primary Circuits (8/42)	.10	.10
MS-4—Specifications for Indicating and Cumulative Demand Register Scales (8/42)	.10	.10
MS-5—Specifications for Indicating Thermal Watt Demand Meters, 1946	.10	.10
MS-6—Specifications for Marking and Arrangement of Terminals for Phase-Shifting Devices Used in Metering, 1946	.10	.10
TD-1—Suggestions for Specifications for Bolts and Nuts (5/37)	.20	.20
TD-2—Suggestions for Specifications for Strand Eye Anchor Rods (5/42)	.10	.10
TD-3—Suggestions for Specifications for Lag Screws (10/38)	.10	.10
TD-4—Suggestions for Specifications for Eye Bolts (6/39)	.10	.10
TD-5—Suggestions for Specifications for Eyenuts and Eyelets (4/41)	.10	.10
TD-6—Suggestions for Specifications for Steel Crossarm Braces (5/40)	.10	.10
TD-8—Suggestions for Specifications for Straight Tinned Copper Connectors (10/40)	.10	.10
TD-9—Specifications for Single Tube Seamless Copper Splicing Sleeves (10/42)	.10	.10
TD-10—Suggestions for Specifications for Rolled Steel Washers (5/40)	.10	.10
TD-12—Specifications for Pole Guards, 1946	.10	.10
TD-15—Specifications for Pole and Lower Steps, 1946	.10	.10
TD-17—Specifications for Bolt Type Steel Insulator Pins with One Inch Diameter Lead Threads, 1947	.10	.10
TD-51—Suggestions for Specifications for Low and Medium Voltage Fin-Type Lime-Glass Insulators (2/43)	.25	.25
TD-61—Suggestions for Specifications for Type "A" Untreated Douglas Fir Crossarms (11/40)	.10	.10
TD-62—Suggestions for Specifications for Type "B" Untreated Douglas Fir Crossarms (11/40)	.10	.10
TD-71—Suggestions for Specifications for Insulator and Pin Threads and Gauges (5/37)	.10	.10

General Commercial Committees

Agriculture

	Members	Non-Members
P-7—Utility Farm Promotion, 1947	$ .40	$ .50
In-Service Training Program for Agricultural Workers	1.50	1.50
Farm Electrification Manual	5.00	8.00
Suggestions on Agricultural Development for Electric Companies	3.50	3.50

General

Q-11—Suggested Field Test Procedure for Determination of Coefficient of Performance and Performance Factor of an Electric Heat Pump While Operating on the Heating Cycle	.25	.25
P-6—The Heat Pump (7/47)	.25	.25
P-5—A Guide for the Selection of Sales Personnel	.75	.75
Analysis and Development of Commercial Market	.50	1.00
Directory of Manufacturing of Commercial and Small Industrial Equipment (6/46)	1.00	1.50
O-16—Position Descriptions for Eight Utility Sales Jobs (12/46)	.35	.35
O-6—Commercial Refrigeration, 1946	.25	.25
O-3—Sales Personnel Practices of Utility Commercial Sales Department, 1946	.40	1.00
O-1—Salesmen's Reminder, 1946	.25	.25
M-11—Report of Sales Personnel Committee (10/45)	.35	.35
M-14—Home Service Suggestions for organizing and operating Home Service Departments of Electric Companies	.40	1.00

Lighting

O-9—Utility Home Lighting Promotion, 1946	.40	.40
O-8—A Comparison of Conventional Hot Cathode and Cold Cathode Tubing Fluorescent Light Sources, 1946	.25	.25

Postwar Planning

Section II—An Appraisal of Our Competition		.50
Section III—Rural Electrification		.25
Section IV—Industrial Power Markets		.25
Section V—Market Problems in Residential Field		.50
Section VI—Postwar Lighting Markets		.50

Power

I-1—Power Sales Manual—Sections 1-17 and Supplements to Jan. 1, 1948 (Includes one binder—extra binders $2.00) (Individual section and quantity prices available on request)	8.95	11.20
G-4—Electric Metal-Melting Furnaces (1/40)	.80	2.00
F-11—Electrification of Oil Refineries (10/38)	.30	.75

Water Heating

P-3—Electric Water Heater Installation Manual—Section I	.50	.50
O-4—Model Specifications for the Installation of Wiring and Plumbing for Automatic Electric Storage Water Heaters	.25	.25
F-8—Test Specifications, Automatic Electric Storage Water Heaters, EEI-NEMA	.20	.50

National Programs

Better Light—Better Sight Bureau

"Light Is What You Make It"	5.00 per 100	
"Priceless Eyes"	4.50 per 100	
School Classroom Program for Teaching 5th and 6th Grade Students about light and sight	Price list upon request	

Commercial Cooking

Sales Training Manual — Commercial Electric Cooking	1.50	1.50
The "Penny Folder" — "Invest One Cent in Electricity"	4.00 per 100	
O-7 — Commercial Electric Cooking and Baking Manual (9/46)	.75	1.85
Commercial Cooking Survey, 1942	.25	.25

Domestic Cooking

Meals Go Modern Electrically (Special prices in quantity)	.50	.50

Electric Kitchen Program

A new electric kitchen program complete with a 16 mm. sound movie in color, booklets, mailing folders, newspaper ads.	Price list upon request	

Electric Water Systems Council

"Running Water—The Farm Necessity"	2.50 per 100	
Manual of Water Supply Equipment	.75	1.50

Home Service

Folder—"Here's Your Career"	4.00 per 100	
R-4—Make Home Economics Your Profession (minimum lots 100)	5.00 per 100	

Lighting Films

"10 Charts For Use With Disney Film"		15.00
"Light Is What You Make It"—A sound movie in technicolor, produced by Disney Productions, 16 mm., 10 minutes		Price Upon Request
"Let There Be Light" (Street Lighting sound slide film, 15 minutes, 75 frames		25.00
"See For Yourself" (Home Lighting) sound slide film, 15 minutes, 105 frames		30.00

Planned Lighting Program

Stores, Schools, Offices, Industrial Homes—(A group of promotional publications on above)	Price List Upon Request	

Sales Training Course

Basic Sets of 8 Films and Records	Set	$200.00
Basic Sets of 8 Salesmen's Manuals	Set	5.00
Residential Sets of 4 Films & Records	Set	100.00
Residential Sets of 4 Salesmen's Manuals	Set	2.50
Commercial Sets of 4 Films & Records	Set	100.00
Commercial Sets of 4 Salesmen's Manuals	Set	4.00
Rural Sets of 2 Films & Records	Set	50.00
Rural Sets of 2 Salesmen's Manuals	Set	1.00
Industrial Sales Training Handbook		18.50
Residential Lighting Film & Record		30.00
Residential Lighting Salesmen's Manual		.75

Water Heating

Self-mailers to Dealers (minimum lots 100)	1.50 per 100	
Self-mailers to Customers (minimum lots 1000)	15.00 per 1000	
Stuffers in sets of 6 pieces (minimum lots 1000)	15.00 per 1000 sets	

Wiring

M-8—Handbook of Farmstead Wiring Design	.40	.40
M-7—Handbook of Residential Wiring Design	.25	.25
Basic Factors of Adequate Wiring—1939	.25	.25
Covered Neutral Cable Helps Sell Adequate Home Wiring—1939	.25	.25
Commercial Building Rewiring Market—1939	.35	.35
(Price on above three books as a group is 60c. per set)		

Wiring Films

Commercial Re-wiring — lantern slides, with lectures	Set	$25.00
Home Wiring — lantern slides, with lectures	Set	25.00

Miscellaneous, Reference Books, etc.

Q-13—"Take a Look at the Outlook"	10c	
Q-14—"I Want to Know About the Electric Industry"	2—100 copies 30c each 100—1,000 copies $25 per 100 1,000—9,000 copies $200 per 1000 10,000 or more copies $140 per 1000	
Q-5—Specifications for Impregnated Paper-Insulated Lead Covered Cable, "Low Pressure, Gas-Filled" Type—AEIC 1948	Single copies	$1.00
	10 or more "	.85
M-13—Specifications for Impregnated Paper-Insulated Lead Covered Cable, "Solid" Type, "Oil-Filled" Type	Single copies	$1.00
	10 or more "	.85
Objective Type Rates, 1933-1936	.80	2.00
Ice and Wind Loading Tables for Overhead Line Conductors (Revision of Tables 85 to 96 of the Overhead System Reference Book) 1942	1-4 copies	10c.
	5-49 "	6c.
	10.00	25.00
Rate Book for 1947		
Storm Loading and Strength of Wood Pole Lines and a Study of Wind Gusts (1936)	2.00	5.00
Weekly, Monthly and Annual Statistics (Includes Annual Statistical Bulletin; Weekly Electric Power Output; Monthly Electrical Research Statistics)	2.00	2.00

Periodicals

Commercial Sales Log (several issues per year)	Each issue priced individually	
Better Light—Better Sight News (6 issues yearly)	1.00	1.00
Edison Electric Institute Bulletin (Monthly)	2.00	2.00
Farm Electrification (a bi-monthly publication) Up to 10 copies	Free	
Over 10 copies	.75	1.00

Discount for orders of 25 or more paid subscriptions, if mailed in bulk to one address.....25%
Discount for orders of 25 or more paid subscriptions, if mailed to separate addresses.....10%

PERSONALS

ALTON T. LITTLEFIELD has been elected a vice president of the Central Maine Power Co., Augusta.

Graduating from the University of Maine in 1921, he joined the company as a security salesman. Later he served as advertising manager, director of publicity and public relations, and general commercial manager. In 1947 he became manager of division operations, operations of which he will continue to direct in his new office.

CARROLL S. MITCHELL, assistant to the president, Central Maine Power Co., has been named assistant secretary, succeeding Mr. Littlefield. Mr. Mitchell joined the New England Public Service Co., Augusta, in 1927 in the statistical department. In 1935 he became assistant to W. S. Wyman, late president of the Central Maine company.

JAMES H. FOOTE of Jackson, Mich., chief engineer of The Commonwealth & Southern Corp. (New York), has been elected a vice president of that company.

Commonwealth of New York is the mutually owned service company for the subsidiaries of the Commonwealth & Southern Corp. (Del.) and, under the proposed reorganization plan now before SEC in connection with the dissolution plan for Commonwealth of Delaware, the service company will be reorganized as an independent company, tentatively named Commonwealth Services Inc. It is expected that Mr. Foote will continue as an officer of the new company.

Nationally known in engineering circles, Mr. Foote has been a practicing engineer in the state of Michigan for more than 30 years. He is a son of the late James B. Foote, one of the founders of Consumers Power Co.

EDWARD P. NOPPEL has been elected a vice president of Ebasco Services Inc. He has been a director of the company since 1942.

Mr. Noppel has been associated with Electric Bond and Share Co., and its subsidiary, Ebasco Services Inc., since 1925 when he started as an assistant gas engineer. Later he became sponsor engineer, operating sponsor and then general consultant.

After graduating from the University of Pennsylvania, Mr. Noppel was employed as an assistant engineer for the Scranton Railway Co. and later by the U. S. Navy Department in Philadelphia as an engineering assistant in connection with the construction and operation of gas and power plants.

CARL F. MYERS, formerly engineer in charge of overhead construction for the Puget Sound Power & Light Co. at Seattle, Wash., has joined the Electric Bond & Share Co. He is now at Ebasco International in New York on an engineering assignment on electric properties.

M. L. WARING, planning engineer of Consolidated Edison Co. of New York, Inc., since 1947, has been elected an assistant vice president. Mr. Waring will assist James F. Fairman, vice president in charge of electric and gas production and operation. In 1933, Mr. Waring joined the New York Edison Co., a predecessor of Consolidated Edison Co., as a junior engineer. Three years later he was made an assistant engineer. Following military service in World War II, he returned to Consolidated Edison, spending a year on the company's executive development program. Since 1947 he has been responsible for planning the development of the system's electric, gas and steam properties.

Announcement has been made of the appointment of ROBERT C. HIENTON to succeed JACK E. NORTH as general sales manager of The Cleveland Electric Illuminating Co.

Mr. Hienton's present position as manager of the industrial sales department will be assumed by J. R. DAVID. RAYMOND E. MAUSK will succeed Mr. David as supervisor of the industrial sales department for the central and western districts, and RANDALL J. MILLER will take over Mr. Mausk's present position of assistant to the general sales manager. Mr. Miller has been assistant manager of residential sales.

Mr. North joined the Illuminating Company in 1919. He was named director of residential sales in 1934 and became general sales manager in 1943. He drew up the first promotional program for the Electrical League of Cleveland, in which he has been very active since 1920. He became president of the League in 1923 and served continuously in that position until last January. In 1933, Mr. North received the James H. McGraw Medal for fostering cooperation in the industry. He was also the first president of the International Association of Electrical Leagues and chairman of the National Better Light-Better Sight Bureau.

Mr. Hienton was located in the company's eastern district headquarters at Ashtabula from 1928 to 1942. He was director of the industrial development division from 1943 to 1947.

HOWARD P. SEELYE has been appointed chief engineer of the engineering department of The Detroit Edison Co. EDWARD R. MOORE is appointed assistant chief engineer of the department.

At the same time it was announced that the name system engineering, formerly designating the engineering group, is changed to engineering department and will consist of the planning, civil, electrical and mechanical engineering divisions.

Mr. Seelye, a graduate in civil engineering from the University of Michigan, joined the company in 1916. Before his recent appointment he was chief electrical engineer in charge of the electrical section of the engineering division.

Mr. Moore, who is a graduate electrical engineer from Pennsylvania State College, came to the company in 1926, and was formerly assistant to the chief engineer of the system.

ARTHUR S. ALBRIGHT, controller of The Detroit Edison Co. since 1943, has been elected treasurer of the company by its directors. Mr. Albright succeeds John L. MacLeod who died last May. The board also appointed CHARLES R. LANDRIGAN, heretofore assistant controller, as controller.

Mr. Albright joined The Detroit Edison Co. in 1912 as an engineer in the statistical department after his graduation from Ohio State University with a degree in electrical engineering. He served as superintendent of meters and acting chief of research before his appointment as controller.

Mr. Landrigan started with Detroit Edison as a repair parts clerk in 1912 and became chief clerk of power plants in 1915. After an enlistment in the Army Ordnance Department in 1917, he returned to the company in the construction department and was trans-

ferred later to the controller's staff. He became assistant controller in 1932.

The board of directors also announced the appointment of ELDRED H. SCOTT and J. HUBERT MCISAAC as assistant controllers, and the appointment of LOUIS C. PROVENCHER as assistant secretary of the company.

Other promotions announced were: EVERETT E. ROLL, assistant to the general accountant; RAY J. PLOURDE, assistant supervisor, general accounting department; JAMES R. WATSON, supervising accountant; ANTHONY J. MAIHOFER, assistant property engineer, and ARTHUR E. BUSH, statistician.

ALOYSIUS C. MARCERO, superintendent of the Conners Creek plant of The Detroit Edison Co., has retired after 35 years of service with that company. Mr. Marcero has been superintendent of the plant since 1923. Mr. Marcero's place will be taken by ALBERT C. PASINI.

Also retiring is WESLEY W. BREAK, plant engineer of the company's central heating plant on Beacon St. Mr. Break's place will be taken by EDMUND N. BROWN. Mr. Break was appointed plant engineer at Beacon St. during its construction in 1926 and has been in direct operating charge of it up to the time of his retirement.

Mr. Marcero has been closely associated with the company's pioneering work for boiler and turbine development and has had an active part in planning the two new 100,000-kw turbines which are scheduled for installation at Conners Creek in the near future.

MILTON H. PRINCE has been appointed director of personnel of the Minnesota Power and Light Co., Minneapolis, and T. O. PERRAULT, director of safety. The promotions resulted from vacancies created by the retirement of W. C. LOUNSBURY, who had held both positions. Mr. Perrault first became associated with the company in 1941, and Mr. Prince in 1936.

A. S. CORSON has been appointed comptroller of the Philadelphia Electric Co. Mr. Corson's entire business career has been with the United Gas Improvement Co. and affiliated companies. He was a vice president of that company at the time of his recent appointment.

W. S. FLEMING has been appointed special agent in the executive department of the California Electric Power Co., Riverside, Calif. Mr. Fleming started with the company in 1922. In 1931 he was appointed supervisor of merchandise sales and in 1936 was advanced to merchandise manager. In 1942 he became sales manager, the position he held at the time of his recent promotion.

WALTER J. LYMAN has been appointed Manager, Planning and Development Department, Duquesne Light Co. Also announced was the appointment of E. A. HESTER as consultant to the manager of the Planning and Development Department.

A native of Cambridge, Mass., Mr. Lyman was graduated from Carnegie Institute of Technology in 1924, with a bachelor of science degree in electrical engineering.

Entering the employ of the Duquesne Light Co. in 1924, as an apprentice engineer, Mr. Lyman has since served as a junior engineer and assistant field engineer, and as section engineer and engineering assistant to manager, Planning and Development Department.

Mr. Hester, a native of Stillmore, Ga., was graduated from North Carolina State College in 1916, with a bachelor of science degree in electrical engineering.

He entered the employ of Duquesne Light Co. in 1926, as transmission planning engineer, and has since served as planning engineer and superintendent of planning and development department. From 1941 to 1944, Mr. Hester served with the War Production Board.

HERBERT E. CLIFF, formerly assistant general commercial manager, has been made general commercial manager of the Public Service Electric & Gas Co., Newark, N. J., succeeding JOHN L. CONOVER, retired. GORDON M. PETERSON, formerly assistant to the general commercial manager, has been named assistant general commercial manager, and LOUIS R. QUAD has been promoted from division commercial manager, central division, to assistant general commercial manager.

Starting with Public Service in 1924 as a commercial cadet, Mr. Cliff served in the company's gas department before he was appointed assistant general commercial manager in 1940.

Several changes in the organization of the electric department of Public Service Electric and Gas Company, Newark, N. J., have been made recently.

EDMUND J. THIMME has been appointed industrial relations manager; CARLTON L. DUDLEY, assistant general superintendent of distribution; OSCAR BAUHAN, transmission and substation engineer; THEODORE SEELY, division superintendent, Essex Division; JOSEPH J. GLATZEL, division superintendent, Passaic Division; THEODORE G. PIERSON, assistant division superintendent, Passaic Division; and DAVID E. MCFARLAND, division distribution engineer, Passaic Division.

These changes follow the promotion of ARTHUR R. NELSON from assistant general superintendent of electric distribution to general superintendent of electric distribution. Mr. Nelson succeeds John S. Ware, who died April 23.

A graduate electrical engineer of Massachusetts Institute of Technology in 1923, Mr. Thimme started with Public Service as a draftsman in 1922. The following year he was appointed a cadet engineer and in 1926 he was made an engineer in the Passaic Division. In 1929 he was promoted to division distribution engineer and was named assistant to the division superintendent, Passaic Division, in 1937. Mr. Thimme became division superintendent in that division in 1945.

Mr. Dudley graduated from Sheffield Scientific School, Yale University in 1919. After one year of graduate work in engineering, he started with Public Service as a cadet engineer in 1920 and later became engineer in the company's Essex Division. In 1926, he was transferred to the general office as an engineer and five years later became assistant distribution engineer. He served as division superintendent, Southern Division until 1942, when he was transferred to Essex Division in the same capacity.

After graduation from Stevens Institute of Technology in 1923, Mr. Bauhan started with the company as district substation operator in the New Brunswick district. Transferred to the general office in 1924, he served until 1942 as engineer and installation engineer on the design and construction of substations and switching stations. Mr. Bauhan, in 1942, was assigned the job of coordinating the engineering of Public Service facilities with the equipment of the various war industries. In 1945 he was promoted to assistant transmission and substation engineer.

Starting with Public Service as a cadet engineer following his graduation from Stevens Institute of Technology with the degree of mechanical engineer

in 1923, Mr. Seely was later assigned to the Electric Distribution Department, Central Division. In 1930, he entered the office of the distribution engineer of the general office, as assistant engineer. He was advanced to distribution planning engineer in 1937, and to assistant distribution engineer in 1940. In 1943, Mr. Seely was made assistant transmission and substation engineer, and in 1945 he was made transmission and substation engineer.

Mr. Glatzel started with Public Service in 1926 as Passaic Division substation engineer after having been associated with General Electric Co. He was made Central Division substation engineer in 1937 and returned to Passaic Division as assistant division superintendent in 1945. He was graduated from Rutgers University with a bachelor of science degree in electrical engineering in 1923 and later took graduate work in engineering at Brooklyn Polytechnic Institute.

Mr. Pierson started with Public Service as a cadet engineer in 1928 after being graduated by Lehigh University. He was assigned to Passaic Division in 1931. Four years later he became district distribution engineer and in 1938 was made division distribution engineer, Passaic Division.

After graduating from Stevens Institute of Technology in 1925 with a mechanical engineering degree, Mr. McFarland started with Public Service as a cadet engineer. In 1936 he was made district distribution engineer. Two years later he was made assistant engineer and in 1940 became assistant division distribution engineer.

JAMES T. LAWSON, who has been electrical operating engineer in the electric generation department, Public Service Electric & Gas Co., Newark, N. J., since 1931, has retired after more than 51 years' service with Public Service and predecessor companies.

WILLIAM H. RUPPEL has been elected assistant treasurer of West Penn Power and Railways Companies. He will continue to serve as assistant treasurer of the two coal companies which are part of the West Penn System. A 29-year veteran, Mr. Ruppel had previously been in charge of stock transfer.

EDWARD R. JOHNSTON was promoted to credit manager. He has been assistant credit manager for the past 14 years, and has been with West Penn for 22 years.

F. DEAN HAYES, assistant treasurer and credit manager of West Penn Power Company, is retiring after 22 years of service. He has been an active member of the Credit Association of Western Pennsylvania, serving two terms as president.

C. W. KENNEY, construction engineer for West Penn Power Co., has retired after more than 43 years of service. He had been responsible for the many civil engineering projects in the company's system.

GORDON B. HOFFMAN has been promoted to the post of company civil engineer, in which he will be responsible for the civil engineering design of all construction projects for the company's power and operating departments. A Cornell graduate, he joined West Penn in 1931 as an engineer at New Kensington.

GEORGE L. BRAITHWAITE was named assistant civil engineer. He joined West Penn in 1920 as a chainman, and has risen steadily through the ranks.

ROLAND R. BLANTZ, formerly general line foreman of the Portland General Electric Co.'s Oregon City division, has been promoted to the position of safety engineer.

L. R. PATTERSON, formerly staff engineer, electric operations, has been named superintendent, electric system planning, by the Public Service Co. of Colorado, Denver.

Mr. Patterson joined Public Service in 1923 as a draftsman in the electric distribution engineering department and has filled various engineering assignments in the electric operating department.

M. S. MIKSCH has been appointed purchasing agent for the Pacific Power & Light Co., Portland, Ore., in order to relieve veteran J. B. KILLMORE of the heavy responsibilities he has carried for many years. Mr. Miksch was formerly assistant purchasing agent, and has been with the organization since 1925.

JOHN R. FREDERICK, commercial and industrial sales manager for the Wisconsin Power & Light Co., Madison, has been named director of industry development. He will work in close cooperation with district managers.

Protecting the Taxpayer

(Continued from page 267)

well as those of government by universal enforcement.

Moreover, fairness to the taxpayer requires adequate machinery for impartial review of all tax determinations at the administrative level.

I loathe administrative absolutism. Many persons look upon administrative law itself as a Machiavellian distortion of our legal system. I do not agree with that, for administrative law does have an established place in our jurisprudence. The difficulty is not with administrative law but with the way in which it operates.

Much of the resentment toward administrative bodies stems from the suspicion that they fail to recognize the principle, inextricably imbedded in our judicial system, that every man has the right to a full and complete hearing. The late Chief Justice Hughes once described the administrative hearing as an "inexorable safeguard," and said that "it is essential alike to the legal validity of the administrative regulation and to the maintenance of public confidence in the value and soundness of this important governmental process."

I believe that all involuntary tax determinations should be subject to review, in the first instance, by the tax administrator. From his final determination a right of appeal to an appellate board and the courts should be provided. The review of a tax matter, however, should be conducted in a neutral atmosphere. It is unfair to the litigant to require that his tax determination be reviewed by the particular individual who made it. It is unfair to that individual to require him to sit in judgment on his own action. Taxpayers should feel that they are getting a fresh and impartial consideration of their tax problems; and assessing officials should be free to defend their own honest convictions. This is the essence of justice, whether in the courts or before administrative bodies.

In discussing our growing tax burden and the need for legislative and administrative reforms, I have spoken quite intentionally in a serious mood. I fully realize that on every side there are increasing legitimate demands for additional revenue to provide for the general welfare of our people. Never-

theless, I think we have reached a point where increases in the services of government, no matter how desirable they may be, must be evaluated in terms of the burden upon the taxpayer.

There was a time when this was a factor in determining how much governmental service should be bought with public funds. It must be a factor once more. There are powerful lobbies behind the tax spenders. There are very few spokesmen for the taxpayers. Somehow, in our wilderness of taxes, their voices must be heard.

Protect the taxpayer and you protect the revenue.

Economic Trends and Their Possible Effects on the Future

(Continued from page 271)

spending and taxing is that it is so easy to start and so hard to stop. Thus the budget grows and grows until eventually a situation is reached like that in England where the total tax "take" now amounts to 40 per cent of all incomes.

Only recently the British Chancellor of the Exchequer, Sir Stafford Cripps, was forced to tell the British people that the Socialist policy of redistributing wealth through taxation had reached the limit, and that henceforth it would be necessary to rely on creating more wealth rather than distributing what already exists. But how can the creation of new wealth be encouraged under a system, and level of taxation, that places so heavy a load on the productive energies of the people?

To be sure, we have not reached the stage of England; but we are heading fast down the road.

The Fight for Sound Government

This country's production accomplishments during the war, the success in reconversion, and the huge program of peace-time expansion that enabled us to overcome war shortages at home, while at the same time rendering relief and recovery aid to the world—all demonstrate that the dynamic qualities of the American system still endure.

Once again science and invention, teamed with managerial ability and experience, are in countless ways pushing forward into new fields of endeavor, providing new job opportunities, and newer and better products and services for the American people. The new and lustily growing industry of television is but one dramatic illustration of the enterprise system at work. Development of atomic energy lies ahead. Certainly in the light of these achievements and future possibilities, the "mature economy" philosophy preached in the 30's was—to put it bluntly—"the bunk."

This powerful trend of growth can, however, be impeded by government in two ways: either by inflationary credit and fiscal policies which create an artificial demand that over-stimulates and distorts economic development, or by taxes and controls which stifle initiative and enterprise and obstruct the natural adjustments of the economy at every turn. A fact that is brought home to us with more and more weight every day is the never-ending problem of maintaining the forces that built this country and made it great.

Nowhere is this struggle better typified than in the battle now going on over the national budget. There we face the three-way question—whether to cut spending to a level the country can afford to support in taxes; whether to raise taxes with their depressing effect on production and risk taking; or, whether to resort to unsound deficit financing with all its inflationary dangers and legacy of more billions of national debt to burden the people in future years?

The decision on these questions is a crucial one, and what we do now will go far toward shaping the character of the American economy for many years to come.

CONVENTIONS AND MEETINGS

AUGUST

8-11 National Association of Railroad and Utilities Commissioners, Hotel Cleveland, Cleveland, Ohio.
23-26 American Institute of Electrical Engineers, Pacific General Meeting, Fairmont Hotel, San Francisco, Calif.

SEPTEMBER

11-14 Rocky Mountain Electrical League, Fall Convention, Stanley Hotel, Estes Park, Colo.
16-17 The Maryland Utilities Association, Fall Conference, Cavalier Hotel, Virginia Beach, Va.
16-17 Public Utilities Association of the Virginias, Greenbrier Hotel, White Sulphur Springs, W. Va.
19-23 Illuminating Engineering Society, National Technical Conference, French Lick Springs Hotel, French Lick Springs, Ind.
20-21 Pennsylvania Electric Association, Annual Meeting, Benjamin Franklin Hotel, Philadelphia, Pa.
22-23 Southeastern Electric Exchange, Accounting Conference, Henry Grady Hotel, Atlanta, Ga.
22-23 Accident Prevention Committee, EEI, Robert Treat Hotel, Newark, N. J.
28-30 Indiana Electric Association, Annual Convention, French Lick Springs Hotel, French Lick Springs, Ind.

OCTOBER

3-5 Meter and Service Committee, EEI, Leland Hotel, Springfield, Ill.
3-5 Electrical Equipment Committee, EEI, Van Curler Hotel, Schenectady, N. Y.
4-6 Canadian Electrical Manufacturers Association, General Brock Hotel, Niagara Falls, Ont., Can.
11-14 American Standards Association, Annual Meeting, Waldorf-Astoria Hotel, New York, N. Y.
17-20 American Gas Association, Chicago, Ill.
17-21 American Institute of Electrical Engineers, Midwest General Meeting, Netherland Plaza Hotel, Cincinnati, Ohio.
24-26 American Trade Association Executives, Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.
24-28 National Safety Council, Chicago, Ill.
25-27 Pacific Coast Electrical Association, Inc., Fall Conference, Hotel Californian, Fresno, Calif.
31-Nov. 1 Transmission and Distribution Committee, EEI, Lord Baltimore Hotel, Baltimore, Md.

NOVEMBER

7-10 National Electrical Contractors Association, Rice Hotel, Houston, Texas.
14-18 National Electrical Manufacturers Association, Chalfonte-Haddon Hall, Atlantic City, N. J.

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

OFFICERS

ELMER L. LINDSETH, *President*.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
L. V. SUTTON, *Vice-President*.....Carolina Power & Light Co., Raleigh, N. C.
H. S. BENNION, *Vice-President and Managing Director*...420 Lexington Avenue, New York, N. Y.
K. B. CRUMB, *Treasurer*.....American Gas & Electric Service Corp., New York N. Y.
MAE B. WOODS, *Secretary*.....420 Lexington Avenue, New York, N. Y.

BOARD OF DIRECTORS

(Terms Expiring 1950)

E. R. ACKER.....Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y.
AUSTIN D. BARNEY.....The Hartford Electric Light Co., Hartford, Conn.
REX I. BROWN.....Mississippi Power & Light Co., Jackson, Miss.
E. W. DOEBLER.....Long Island Lighting Co., Mineola, N. Y.
L. M. KLAUBER.....San Diego Gas & Electric Co., San Diego, Calif.
J. A. LONGLEY.....Central Illinois Light Co., Peoria, Ill.
H. B. MUNSELL.....Kansas City Power & Light Co., Kansas City, Mo.
R. S. NELSON.....Gulf States Utilities Co., Beaumont, Texas
C. E. OAKES.....Pennsylvania Power & Light Co., Allentown, Pa.
B. F. PICKARD.....Interstate Power Co., Dubuque, Iowa
McGREGOR SMITH.....Florida Power & Light Co., Miami, Fla.
A. C. SPURR.....Monongahela Power Co., Fairmont, W. Va.
O. TITUS.....Metropolitan Edison Co., Reading, Pa.

(Terms Expiring 1951)

J. T. BARRON.....Public Service Electric and Gas Co., Newark, N. J.
J. M. BARRY.....Alabama Power Co., Birmingham, Ala.
GEORGE M. GADSBY.....Utah Power and Light Co., Salt Lake City, Utah
D. E. KARN.....Consumers Power Co., Jackson, Mich.
J. E. LOISEAU.....Public Service Co. of Colorado, Denver, Colo.
PAUL B. McKEE.....Pacific Power and Light Co., Portland, Ore.
C. B. McMANUS.....Georgia Power Co., Atlanta, Ga.
S. C. McMEEKIN.....South Carolina Electric & Gas Co., Columbia, S. C.
GROVER C. NEFF.....Wisconsin Power and Light Co., Madison, Wis.
P. H. POWERS.....West Penn Power Co., Pittsburgh, Pa.
HAROLD QUINTON.....Southern California Edison Co., Los Angeles, Calif.
J. B. THOMAS.....Texas Electric Service Co., Ft. Worth, Texas
JOHN T. WARD.....Boston Edison Co., Boston, Mass.
W. F. WYMAN.....Central Maine Power Co., Augusta, Maine

(Terms Expiring 1952)

W. C. BECKJORD.....The Cincinnati Gas & Electric Co., Cincinnati, Ohio
H. B. BRYANS.....Philadelphia Electric Co., Philadelphia, Pa.
H. C. CUMMINS.....Northern States Power Co., Minneapolis, Minn.
CHAS. B. DELAFIELD.....Consolidated Edison Co. of New York, Inc., New York, N. Y.
W. G. B. EULER.....Pacific Gas and Electric Co., San Francisco, Calif.
F. C. KELLOGG.....Pioneer Service and Engineering Co., Chicago, Ill.
C. E. KOHLHEPP.....Wisconsin Public Service Corp., Milwaukee, Wis.
P. H. McCANCE.....Duquesne Light Co., Pittsburgh, Pa.
R. E. MOODY.....Union Electric Company of Missouri, St. Louis, Mo.
IRWIN L. MOORE.....New England Electric System, Boston, Mass.
A. T. O'NEILL.....Buffalo Niagara Electric Corp., Buffalo, N. Y.
HAROLD TURNER.....The Ohio Power Co., Canton, Ohio
G. W. VAN DERZEE.....Wisconsin Electric Power Co., Milwaukee, Wis.
F. M. WILKES.....Southwestern Gas & Electric Co., Shreveport, La.

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

(Continued)

ADVISORY COMMITTEE 1948-1949

D. C. BARNES...Virginia Electric & Power Co., Box 431, Charlottesville, Va.
E. F. BARRETT.....Long Island Lighting Company, Mineola, N. Y.
S. R. BERTRON.....Houston Lighting & Power Co., Houston, Texas
J. B. BLACK.....Pacific Gas and Electric Co. San Francisco, Calif.
GEORGE H. BLAKE
Public Service Electric and Gas Co., Newark, N. J.
B. F. BRAHENEY.....Northern States Power Co., Minneapolis, Minn.
PRENTISS M. BROWN.....The Detroit Edison Co., Detroit, Mich.
CURTIS E. CALDER.....Electric Bond & Share Co., New York, N. Y.
J. W. CARPENTER.....Texas Power and Light Co., Dallas, Tex.
GEORGE A. DAVIS.....Oklahoma Gas and Electric Co., Oklahoma City, Okla.
SAMUEL FERGUSON....The Hartford Electric Light Co., Hartford, Conn.
J. F. FOGARTY.....The North American Co., New York, N. Y.
H. P. LIVERSIDGE.....Philadelphia Electric Co., Philadelphia, Pa.
E. J. MACHOLD.....Niagara Hudson Power Corp., Syracuse, N. Y.
T. W. MARTIN...Alabama Power Co., Birmingham, Ala.
J. WESLEY MCAFEE.....Union Electric Co. of Missouri, St. Louis, Mo.
IRWIN L. MOORE.....New England Electric System, Boston, Mass.
W. C. MULLENDORE....Southern California Edison Co., Los Angeles, Calif.
A. B. PATERSON.....New Orleans Public Service Inc., New Orleans, La.
W. H. SAMMIS.....Ohio Edison Co., Akron, Ohio
WILLIAM SCHMIDT, JR.,
Consolidated Gas Electric Light & Power Co., Baltimore, Md.
PHILIP SPORN.....American Gas & Electric Co., New York, N. Y.
L. V. SUTTON.....Carolina Power & Light Co., Raleigh, N. C.
R. H. TAPSCOTT..Consolidated Edison Co. of N. Y. Inc., New York, N. Y.
E. S. THOMPSON....The West Penn Electric Co., Inc., New York, N. Y.
J. V. TONER.....Boston Edison Co., Boston, Mass.
G. W. VAN DERZEE.....Wisconsin Electric Power Co., Milwaukee, Wis.
J. R. WHITING...The Commonwealth & Southern Corp., New York, N. Y.
E. A. YATES....The Southern Company, New York, N. Y.

CHAIRMEN OF EDISON ELECTRIC INSTITUTE COMMITTEES (1949-1950)

ACCOUNTING

Accounting Division Executive, W. H. ZIMMER.....The Cincinnati Gas & Electric Co., Cincinnati, Ohio
Application of Accounting Principles, H. H. SCAFF.....Ebasco Services, Inc., New York, N. Y.
Customer Activities, J. D. ELLIOTT.....The Detroit Edison Co. Detroit, Mich.
Depreciation Accounting, A. E. BRAUHAN.....Public Service Electric & Gas Co., Newark, N. J.
General Accounting, H. S. KING.....The Commonwealth & Southern Corp., New York, N. Y.
Plant Accounting and Records, F. E. DRAPALIK.....Union Electric Co. of Missouri, St. Louis, Mo.
Taxation, C. J. TRUDEAU.....Wisconsin Electric Power Co., Milwaukee, Wis.

COMMERCIAL

Commercial Division General, HARRY RESTOFSKI.....West Penn Power Co., Pittsburgh, Pa.
Sales Personnel and Training, E. O. GEORGE.....The Detroit Edison Co., Detroit, Mich.
Wiring and Specifications, F. E. DAVIS.....The Commonwealth & Southern Corp., Jackson, Mich.
Commercial Sales Section, C. A. STEVENS.....Public Service Electric & Gas Co., Newark, N. J.
Farm Section, J. C. CAHILL.....The Detroit Edison Co., Detroit, Mich.
Industrial Power and Heating Section, R. G. ELY.....Public Service Electric & Gas Co., Newark, N. J.
Residential Section, H. A. STROUD.....Monongahela Power Co., Fairmont, W. Va.

ENGINEERING

Engineering Division General, E. W. DILLARD.....New England Power Service Co., Boston, Mass.
Electrical Equipment, B. VAN NESS, JR.....Pennsylvania Power & Light Co., Baltimore, Md.
Hydraulic Power, G. J. VENCILL.....Union Electric Co. of Missouri, St. Louis, Mo.
Meter and Service, H. A. BROWN.....Rochester Gas & Electric Corp., Rochester, N. Y.
Prime Movers, F. P. FAIRCHILD.....Public Service Electric & Gas Co., Newark, N. J.
Transmission and Distribution, J. E. MCCORMACK.....Consolidated Edison Co. of New York, Inc., New York, N. Y.

GENERAL

Accident Prevention, W. T. ROGERS.....Ebasco Services Inc., New York, N. Y.
Financing and Investor Relations, C. E. OAKES.....Pennsylvania Power & Light Co., Allentown, Pa.
Industrial Relations, S. F. LEAHY.....The Detroit Edison Co., Detroit, Mich.
Insurance, I. M. CARPENTER.....Ebasco Services Inc., New York, N. Y.
Membership, J. F. FOGARTY.....The North American Co., New York, N. Y.
Prize Awards, G. E. WHITWELL.....Philadelphia Electric Co., Philadelphia, Pa.
Purchasing and Stores, R. P. SNOW.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Rate Research, S. W. ANDREWS.....American Gas & Electric Service Corp., New York, N. Y.
Statistical, O. E. SMITH.....Consolidated Gas Electric Light & Power Co., Baltimore, Md.
Transportation, LINN EDSALL.....Philadelphia Electric Co., Philadelphia, Pa.
Codes and Standards (a Subcommittee of the Board of Directors), J. T. BARRON.....Public Service & Electric Gas Co. Newark, N. J.